

**The Effects Of Stress Incontinence On Women And Its Management
By Health Care Professionals, During Pregnancy And Following
Delivery**

Linda Mason

A thesis submitted in partial fulfilment of the requirement of Liverpool John Moores
University for the degree of Doctor of Philosophy.

October 1999

Contents

List of tables and figures

Acknowledgements

Abstract

Chapter		Page
1	Introduction to the thesis	1
2	Literature review	7
	Incontinence	7
	Anatomy of the female lower urinary tract and pelvic floor	9
	Micturition	15
	Continence mechanism	16
	Aetiology of stress incontinence during pregnancy	19
	Aetiology of stress incontinence following delivery	20
	The prevalence of stress incontinence	30
	Treatment for the condition	38
	Pelvic floor exercises	44
	Effects of stress incontinence	57
	The rationale behind the study	66
3	Methodological considerations	69
	Context of the study	69
	Methods	73
	Womens questionnaire	80
	Medical records information	90
	Health professional questionnaire	92
	Interviews	95
4	Methods	105
	Womens questionnaire	105
	Medical records information	111
	Health professional questionnaire	112
	Interviews	115
5	Results - Prevalence of stress incontinence and associated factors	122
	Questionnaire 1	122
	Questionnaire 2	126
	Questionnaire 3	128
	Medical records information	132
6	Results - Pelvic floor exercises	163
	Questionnaire 1	163
	Questionnaire 2	167
	Questionnaire 3	171
	Relationship to stress incontinence	172

7	Results - The health professional study	180
8	Results - The impact of stress incontinence	202
	Interviews at three months following delivery	202
	Interviews at one year postpartum	234
9	Discussion	257
	Prevalence of stress incontinence and associated factors	257
	Service provision	273
	Physical, emotional and practical problems associated with stress incontinence	297
	Summary of recommendations for future research	313
	References	317
	Appendices	i

List of Tables and Figures

	Page
Diagram 2.1 Female lower urinary tract and pelvic floor	10
Diagram 2.2 Muscles of the pelvic floor	13
Table 2.1 Differences in methods and results from previous studies	35
Table 4.1 Comparisons between the type of delivery	109
Table 4.2 Characteristics of the study participants	109
Table 4.3 Representativeness of the interviewees at 8 weeks postpartum	116
Table 4.4 Representativeness of the interviewees at one year postpartum	117
<u>Thirty six weeks of pregnancy</u>	
Table 5.1 Prevalence of stress incontinence	123
Table 5.2 When symptoms began	124
Table 5.3 Frequency of symptoms	124
Table 5.4 Use of sanitary protection	125
Table 5.5 Need to change underwear	125
<u>Eight weeks postpartum</u>	
Table 5.6 Prevalence of stress incontinence	126
Table 5.7 When symptoms began	126
Table 5.8 Frequency of symptoms	127
Table 5.9 Use of sanitary protection	127
Table 5.10 Need to change underwear	128
<u>One year follow up</u>	
Table 5.11 Prevalence of stress incontinence	129
Table 5.12 When symptoms ceased	129
Table 5.13 Frequency of symptoms	130
Table 5.14 Use of sanitary protection	130
Table 5.15 Need to change underwear	131
Table 5.16 Medical advice for the condition	131
Table 5.17 Ethnicity of the sample	135
Table 5.18 Parity of the sample	137
Table 5.19 Parity and method of delivery	139
Table 5.20 Parity and ethnicity	140
Table 5.21 Types of pain relief	141
Table 5.22 Inhalation and stress incontinence	142
Table 5.23 Inhalation and method of delivery	143
Table 5.24 Inhalation and spinal analgesia	143
Table 5.25 Spinal analgesia and stress incontinence	144
Table 5.26 Spinal analgesia and method of delivery	145
Table 5.27 Method of delivery	146
Table 5.28 Odds ratio - method of delivery	159
Table 5.29 Odds ratio - parity	160
Table 5.30 Odds ratio - birthweight	160
<u>Thirty six weeks of pregnancy</u>	
Table 6.1 Receiving information	164
Table 6.2 Source of information	164
Table 6.3 Method of instruction	165
Table 6.4 Performing pelvic floor exercises	165
Table 6.5 Starting pelvic floor exercises	166

Table 6.6	Relationship between antenatal exercises and stress incontinence <u>Eight weeks of pregnancy</u>	166
Table 6.7	Receiving information	167
Table 6.8	Source of information	168
Table 6.9	Method of instruction	168
Table 6.10	Performing pelvic floor exercises	169
Table 6.11	Starting pelvic floor exercises	170
Table 6.12	Relationship between postpartum exercises and stress incontinence	170
Table 6.13	Number of daily sessions <u>One year follow up</u>	171
Table 6.14	Performing pelvic floor exercises	171
Table 6.15	Stopping pelvic floor exercises	172
Table 6.16	Stopping pelvic floor exercises since giving birth	172
Table 6.17	Differences between pelvic floor exercisers and non exercisers	175
Table 7.1	Participants in the health professional survey	181
Table 7.2	Checking for symptoms	182
Table 7.3	Course of action during the antenatal period	183
Table 7.4	Referral patterns	184
Table 7.5	Course of action during the postpartum period	185
Table 7.6	Referral patterns	186
Table 7.7	Satisfaction with the course of action	187
Table 7.8	Improvements in the course of action	187
Table 7.9	Ways of improving the care for women	186
Table 7.10	Ways of improving the instruction on pelvic floor exercises	187
Table 7.11	Provision of instruction in pelvic floor exercises	192
Table 7.12	Time spent instructing	192
Table 7.13	Method of presenting the information	193
Table 7.14	Recommended length of time per day	194
Table 7.15	Recommended number of sessions per day	194
Table 7.16	Recommended number of slow contractions	195
Table 7.17	Recommended length a slow contraction should be held	195
Table 7.18	Recommended number of fast contractions	196
Table 7.19	Verification of the ability to contract the pelvic floor	196

Acknowledgements

I would like to show my appreciation to all those who helped me through the writing of this thesis. In particular I would like to thank my Director of Studies, Professor Sheila Glenn for her support and guidance throughout. Many thanks also to my supervisors Irene Walton and Carol Appleton.

I am grateful to the staff at the hospitals and health authorities where I conducted the studies, particularly those who gave me valuable advice or took the time to respond to the survey. I would also like to thank all of the women who took the time and trouble to participate in the study.

My thanks must also go to my parents and sister Elaine, who encouraged and supported me. Lastly, I would like to thank the following people who helped me in a number of ways: Tim Morley, Clare Simms, Kate Ramm and Phil Deeks.

Abstract

This is an investigation into stress incontinence during pregnancy and following delivery. The prevalence and factors associated with the condition are explored. The service provision for women with, or at risk of suffering from the condition is considered, with a focus on the instruction in pelvic floor exercises. The effectiveness of the service provision is also assessed with respect to the women's needs. Finally, the study explores the effects of the condition upon the sufferer.

Quantitative and qualitative techniques in the form of triangulation were used to gather the data. A series of postal questionnaires were sent to a large sample of women during their pregnancy and following delivery. Additional information was obtained from their medical records. Interviews were carried out with women who had stress incontinence. A postal survey was also conducted with a range of health professionals involved in antenatal or postnatal care.

The findings showed that a large proportion of women suffered from the condition during pregnancy and following delivery. Factors most closely associated with the condition were parity and method of delivery. Antenatal pelvic floor exercises appeared to provide some protection from stress incontinence yet no association was found between postnatal exercises and the presence or absence of stress incontinence. It is hypothesised that this was partly due to the data being obtained from the 'real world' i.e. the instruction was provided on an adhoc basis and varied in content, consequently few women exercised regularly. Few women sought help yet many were affected both physically and psychologically by their condition.

Implications from the study are: there is a need to raise awareness of the condition and change attitudes towards it. Improvements in service provision are needed,

especially with respect to the instruction in pelvic floor exercises and the support offered to women who suffer from the condition. More research is needed to confirm the relationship between antenatal and postnatal pelvic floor exercises and stress incontinence. Further research is also needed to clarify those factors associated with the condition in order to understand the causes more fully.

Appendices

Contents

Appendix number		page
1	Information sheet	i
2	Consent form	ii
3	Letters accompanying the womens questionnaires	iii
4	Questionnaire 1 Bladder problems during pregnancy	vi
5	Questionnaire 2 Bladder problems after pregnancy	viii
6	Questionnaire 3 Bladder problems - follow up questionnaire	x
7	Invite to interview letter	xii
8	Medical records information sheet	xiii
9	Letter accompanying health professional questionnaire	xv
10	Health professional questionnaire	xvi
11	Methodological considerations of multivariate analysis and results for non significant findings	xx
12	Additional comments made by health professionals	xxiii
13	Paper accepted for publication by Midwifery	xxvi
14	Paper accepted for publication by Birth: Issues In Perinatal Care	xxvii

Chapter 1

Introduction To The Thesis

The overall aim of the study was to investigate a number of issues relating to stress incontinence during pregnancy and following delivery: the prevalence of the condition, factors associated with its development, the provision of related services and its effects on the women who suffered from it. Both quantitative and qualitative techniques in the form of triangulation were used to obtain the most appropriate data for each of the separate sections of the study.

1.1 Background

A review of the literature showed that studies varied in their findings with respect to the prevalence of stress incontinence during pregnancy and following delivery. One of the aims of the present study therefore was to highlight the differences which may have caused variations in the prevalence figures, and also to clarify the prevalence in a sample of women who were representative of those using the antenatal and postnatal services. A series of questionnaires were sent out to 919 women recruited at antenatal booking clinic. Each woman received a questionnaire at thirty six weeks of pregnancy and eight weeks postpartum. Those reporting stress incontinence at eight weeks were sent a follow up questionnaire at one year following delivery. Fifty nine percent of women reported symptoms of stress incontinence during pregnancy whilst 31% had symptoms following delivery. Of those reporting symptoms at eight weeks postpartum, 65% still had symptoms at one year follow up. Thus a large proportion of all women appear to be at

risk of developing the condition in their childbearing years. For a number of these women, without treatment the symptoms may remain a long term problem.

Possible risk factors, or variables associated with the condition, have previously been investigated in order that the causes of the condition may be more fully understood. This also has implications for clinical practice. However, not all studies have reached the same conclusions. By reviewing these factors, the present study aimed to shed further light on the risk factors associated with the condition. As greater understanding of the causes of stress incontinence has been acquired through continued studies using new techniques, additional factors have been implicated in the identification of risk factors for stress incontinence. This led to the investigation within the present study of possible maternal and obstetric risk factors which have previously not been considered. A number of factors were found to be associated with the condition, however, in some instances this was thought to be due to the influence of confounding factors. Those variables associated most strongly with stress incontinence were parity, method of delivery and birthweight. However, they were poor predictors of the condition. Although such factors are associated with the condition, these could not be used to predict whether stress incontinence will occur or not. Whilst these findings have few implications for changing clinical practice they do indicate further research is needed.

Although the condition appeared to affect many women during pregnancy and following delivery, issues around service provision have not been explored to date. No data has been published to show what services are available for women at risk, or who suffer from stress incontinence at this time. In addition, the *needs* of the women have not been identified or assessed in light of the service provision. The study therefore investigated the type of information, education and support offered to women in the

antenatal and postnatal periods in order to evaluate their effectiveness. Although there are many different types of treatment for stress incontinence, pelvic floor exercises are a conservative form of treatment and are therefore particularly suitable for women in their childbearing years. Anecdotal evidence suggests that women are taught these exercises at around the time of pregnancy or following delivery, but again little is actually known about the extent and form of the instruction and whether the women comply. The study therefore aimed to focus on issues around the efficacy of pelvic floor exercises, the provision of instruction and compliance of the women. At the time the present study began only one study (Wilson et al 1996) had looked at the effects of antenatal exercises on reducing postpartum stress incontinence. Whilst findings from the study indicated that they may be effective, because a dose response effect was not evident, the authors concluded that further research using a prospective study design was needed in order to obtain more reliable data. The present study therefore used a prospective study design. The data used to examine the service provision was collected by means of the women's questionnaires, interviews with a sample of women at eight weeks postpartum and one year follow up, and a survey of health professionals who provide antenatal or postnatal care. The findings showed that the services were not organised and did not meet the needs of the women in a number of ways. The health professionals themselves also acknowledged that improvements could be made in service provision. With respect to pelvic floor exercises, again the instruction was provided on an adhoc basis. Although in a number of cases it was very good, generally it fell short of the recommendations made in the literature. Whilst a number of women performed pelvic floor exercises, many did not practise them on a regular basis and it was also possible that they were not performing them correctly. The present study also indicated that pelvic floor exercises, carried out regularly in the antenatal period, may help to prevent stress incontinence occurring postpartum. Improvements were necessary in the provision of services for

women with, or at risk of suffering from stress incontinence, particularly with respect to the instruction on pelvic floor exercises. As antenatal pelvic floor exercises may help to prevent postpartum stress incontinence, a shift in emphasis is needed so that women are provided with instruction during the antenatal period and comply with it at this time.

One of the major issues raised with respect to stress incontinence concerns the effects it has upon the sufferer. Although studies have been conducted into the effects of incontinence, these have mainly included all types of incontinence and focused upon elderly or middle aged women. As a result, little is known about how women are affected physically, emotionally, or in practical terms, by stress incontinence during their childbearing years. In light of this, the present study aimed to provide a new perspective by carrying out a qualitative investigation which focused only the effects of stress incontinence on women in their childbearing years. A series of unstructured interviews were carried out with women at eight weeks postpartum and at one year following delivery. The results showed that whilst a small number of women were hardly affected by their condition, many women suffered both physically and psychologically. In particular, the condition placed restrictions on the women's lives and led to feelings of embarrassment and worry. Despite this, few women sought help for their condition. Findings from the study have implications for service providers; there is a need to promote awareness of the condition, recognise the effects it has upon the sufferer, and also the need to change and reorganise service provision so that health care providers seek out those women with problems rather than vice versa.

1.2 Organisation Of The Thesis

The thesis has been organised into the following sections;

Chapter 1 - Chapter 1 reviews the literature pertaining to stress incontinence during pregnancy and following delivery. It begins by looking at the condition itself. The following section considers the link between stress incontinence and childbirth. The different methods of treating stress incontinence are outlined with a more detailed examination of the literature pertaining to pelvic floor exercises. The final section of the literature review looks at how the condition affects those who suffer from it at these times. The rationale behind the study is then provided.

Chapter 2 - This chapter outlines the methodological considerations for the study beginning with an exploration of the background of midwifery research and its current role within health research. Following on from this the strengths and weaknesses of quantitative and qualitative methods are outlined and the case for using triangulation in the present study is put forward. The different forms of data collection are then discussed, and the decisions to use postal questionnaires and unstructured interviews to gather the data are justified.

Chapter 3 - This chapter describes the procedure behind each of the different sections which make up the study. This includes methods of recruitment, sample size, procedure, response rate and methods of analysing the data for the women's questionnaires, medical records, health professional survey and the interviews.

Chapter 4, 5 and 6 - These chapters outline the results from each section of the study. Chapter 4 gives the results from the women's questionnaire and the medical records. These are considered in relation to each other in order to produce information on the

frequency and efficacy of pelvic floor exercises, and the frequency and severity of stress incontinence at three different stages of childbirth. Following this, results from univariate analysis of a variety of possible risk factors for stress incontinence are presented. Lastly, results from multivariate analysis using discriminant function analysis and logistic regression are given. Within chapter 5 findings from the health professional survey are then presented in the form of frequencies, with respect to different aspects of service provision, suggestions for improvements in different aspects of the service are then described. In chapter 6 the narratives from the interviews are described in relation to the services. The next section describes the effects of incontinence and considers why women do not seek help for the condition.

Chapter 7 - Chapter 7 is the discussion chapter. First, the limitations of the present study are presented. The results are then discussed within the framework of the wider body of literature. Conclusions are drawn wherever possible and the implications for future research and clinical practice are presented.

Chapter 2

Literature Review

This chapter provides background information pertinent to the study. First the condition itself is described. This is followed by a brief overview of the anatomy and physiology of the pelvic floor, the process of micturition and the maintenance of continence. Possible reasons as to why the continence mechanism may fail under times of stress are given. Following this, the aetiology of stress incontinence during pregnancy and following delivery is described, along with possible risk factors associated with the condition and the reported prevalence during these times. The next section outlines the methods of treatment for the condition with particularly reference to pelvic floor exercises. This also includes reference to studies on antenatal and postpartum pelvic floor exercise and the current role of health professionals regarding instruction in the exercises. Lastly an overview of studies exploring the effects of incontinence on the sufferer is provided.

2.1 Incontinence

2.1.1 Definition of Incontinence

The International Continence Society (ICS) further define incontinence as 'a condition in which involuntary loss of urine is a social or hygiene problem and is objectively demonstrable' (Bates et al 1979). A survey undertaken by MORI in 1991 estimated that at least three and a half million, and possibly up to ten million people in Britain suffer from some form of urinary incontinence. However, the occurrence of urinary incontinence is greater in women than in men, and also increases with age. According to a postal survey. (Thomas, Plymat, Blannin, and Meade 1980) between one and three per cent of adults aged between 15 and 64 years were estimated to suffer from urinary incontinence, and

eleven percent of females and seven percent of males aged sixty five or above not living in institutions.

2.1.2 Stress Incontinence

The most common form of urinary incontinence is that of stress incontinence. The ICS has defined stress incontinence as 'the involuntary loss of urine occurring when, in the absence of a detrusor contraction, the intravesical pressure exceeds the maximal urethral pressure' (Abrams, Blavias, Stanton, and Anderson 1988). Stress incontinence occurs when the urethra is unable to maintain closure against the force of pressure transmitted from the bladder. Whilst the causes are not yet fully understood, it is thought an incompetent urethral sphincter mechanism may be responsible.

The symptom of stress incontinence is leakage of urine simultaneous to the stress causing it, such as on exertion or during physical exercise. The activities commonly associated with stress incontinence are coughing, laughing, sneezing, lifting heavy weights or during sexual activity. The symptom is not always evident on clinical examination, and diagnosis is usually made by exclusion.

A number of women reporting symptoms of stress incontinence will have a diagnosis of mixed incontinence or urge incontinence (Jensen, Neilsen and Ostergaard 1991). For this reason, it must be noted that the present study concerns only the symptoms of stress incontinence and not the diagnosis. This can only be made following urodynamic investigation which was beyond the remit of the present study.

2.2 Anatomy Of The Female Lower Urinary Tract And Pelvic Floor. (Diagram 2.1)

2.2.1 The Bladder

The empty bladder is positioned anteriorly behind the pubic symphysis, lying between the walls of the pelvis. Superiorly, the surface is covered by the peritoneum. The base of the bladder lies against the muscles of the pelvic floor and is supported by pubovesical fascia. On filling with urine, the bladder changes shape from pyramidal to spherical and expands upwards into the abdominal area (Burnett 1979).

The bladder wall is made up of a meshwork of smooth musculature (the detrusor muscle). The layers are poorly differentiated, with a complex mix of fibres running in all directions. The lining of the epithelium is backed by a layer of loose connective tissue (lamina propria). The epithelium tissue is inelastic but consists of numerous folds (rugae) which allows for expansion as the bladder distends. A triangular area at the base of the bladder is termed the trigone. This area is bounded by the ureteric orifices and internal urethral meatus. Unlike the detrusor, the trigone is fixed (Blavias 1985).

2.2.2 The Bladder Neck

The outflow of the bladder marks the beginning of the urethra. The female bladder neck comprises smooth muscle bundles running longitudinally or obliquely into the urethral wall so no sphincter mechanism is formed, although the bladder neck remains closed at rest. The smooth muscle of the detrusor and bladder neck is innervated by sympathetic fibres (inhibitory) from the lumbar segments of the spinal cord and also by parasympathetic fibres (excitatory) from sacral segments S2 -S4.

Female Lower Urinary Tract And Pelvic Floor

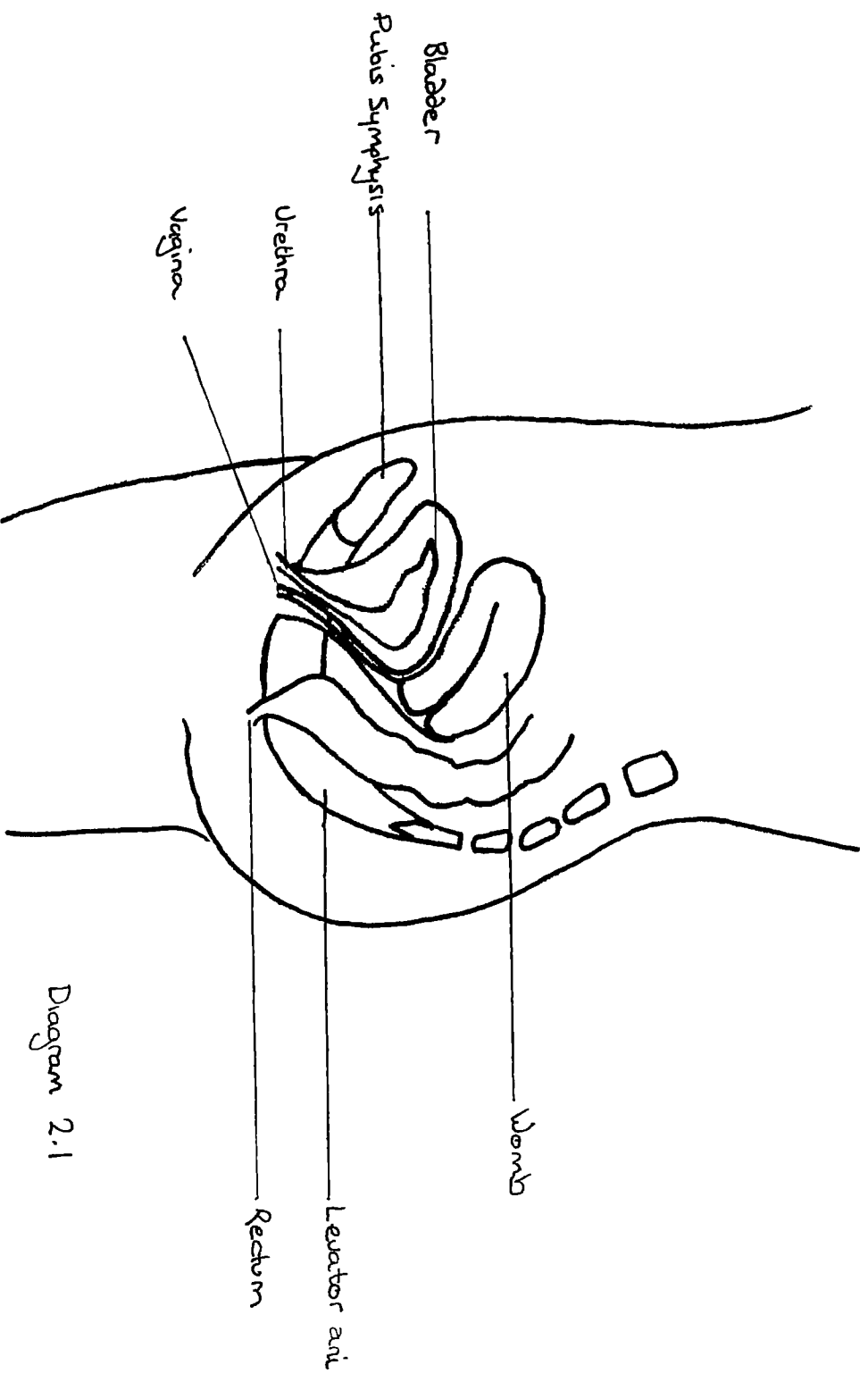


Diagram 2.1

2.2.3 The Urethra

The function of the urethra is to convey urine from the bladder to the outside. It extends from the bladder neck to the external urethral orifice. In the female, the urethra is approximately 4 cm long. It passes through the muscles of the pelvic floor to the vagina and its external meatus opens 2.5cm behind the clitoris. As it leaves the bladder neck (proximally), the lining consists of transitional epithelium, the distal portion is lined by squamous epithelium. This tissue is similar to that lining the vagina and is also influenced by the hormone oestrogen. The urethral musculature consists of two main muscular layers which provide urethral closure / sphincter mechanism (DeLancey 1990).

The inner longitudinal layer (the internal sphincter) comprises smooth muscle which extends from within the bladder neck at the vesicourethral junction, and along two thirds of the length of the urethra. This region is under involuntary control and keeps the urethra closed except during micturition. The mucosal lining of the smooth muscle appears to be a richly vascular layer. Longitudinal folds in the mucosa join together forming a watertight seal. The female mucosa is rich in oestrogen receptors. Where this concentration of oestrogen receptors is lacking, for example as may occur in postmenopausal women, the mucosa is less able to seal and may contribute to incontinence problems (Rud 1980).

The outer circular layer (the external sphincter), formed from skeletal muscle, extends from the bladder neck to the external meatus. The muscle is thickest anteriorly, but posteriorly it becomes thinner and is separated from the vagina only by a thin layer of fascia. The external sphincter consists of striated muscle, the fibres of which lie primarily in a circular orientation. Some of the fibres insert into the vaginal wall as the urethrovaginal sphincter, and others into a region just above the perineal membrane

known as the compressor urethrae. These muscles contract reflexively with sudden increases in abdominal pressure, but can also be contracted voluntarily (Walters 1989).

2.2.4 The Muscles Of The Pelvic Floor (Diagram 2.2)

The pelvic floor muscles are divided into the superficial layer and the deep layer. The superficial layer of muscles are positioned on the undersurface of the deep layer of muscles, surrounding the vaginal and anal orifices. The superficial muscles offer minimal support only. It is the deep muscles that are important to the continence mechanism. The deep layer, known as the levator ani, consists of two sets of muscles. The levator ani exhibit constant tone but can also be contracted during increases in abdominal pressure.

The pubococcygeus muscle arises from the pubis symphysis. The posterior fibres insert into the coccyx and anococcygeal raphe, whilst the anterior fibres join those from the opposite side forming a U shaped sling around the rectum, vagina and urethra. When the muscles are contracted the organs are lifted upwards, helping to maintain the angulation of the bladder with the urethra. The **iliococcygeus muscle** arises from the obturator fascia and symphysis pubis to insert in the coccyx and anococcygeal raphe. A third muscle, the **coccygeus**, sometimes included as part of the levator ani, is a triangular sheet of fibrous tissue and muscle which passes from the ischial spine and sacrospinous ligament into the coccyx. This serves to stabilise the bony pelvis (Lawson 1974, Sampselle and DeLancey 1998).

2.2.5 Ligaments and Fascia

Connective tissue forms fascia that cover the outer surface of the muscles and provide linkage with various muscles. The pelvic fascia is particularly thick and strong. There are 2 types of pelvic fascia. The fascia overlying the muscles of the pelvic floor provides additional interior support whilst the endopelvic fascia connects the muscles and pelvic

The Muscles Of the Pelvic floor

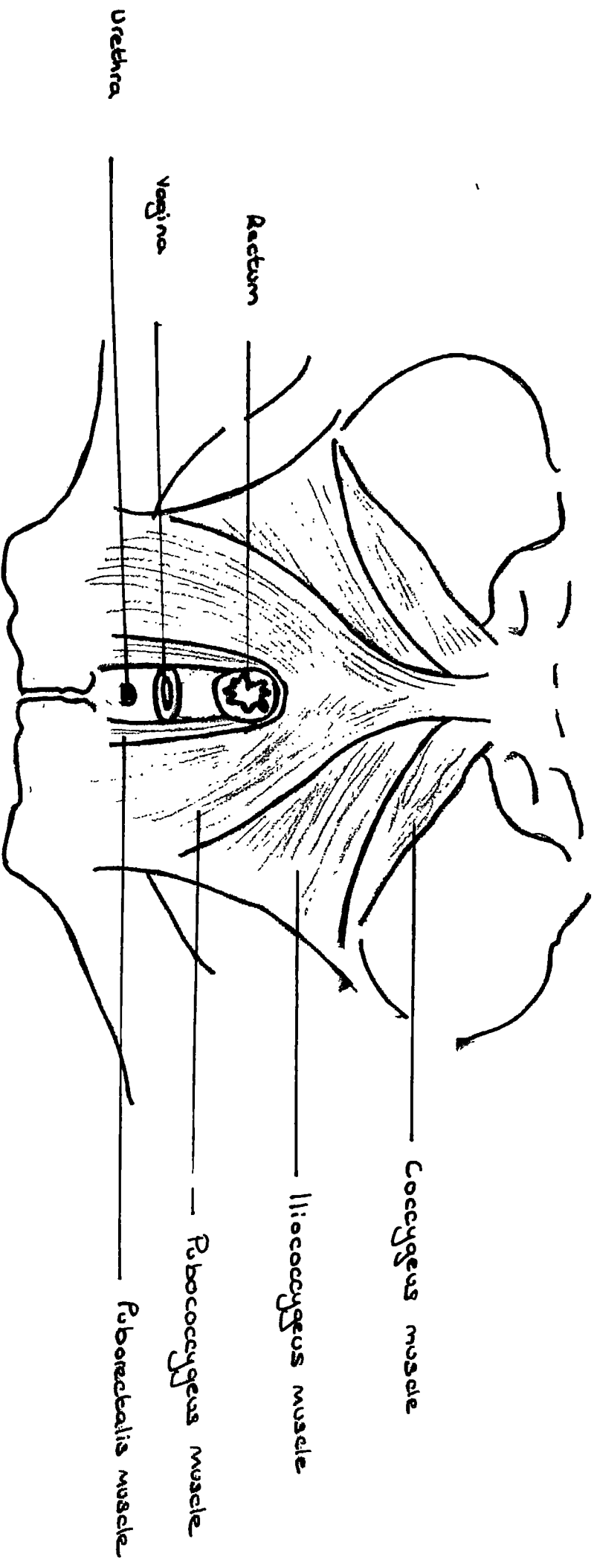


Diagram 2.2

viscera. The fascia of the bladder and anterior wall of the vagina fuse to form the pubocervical fascia. This helps to prevent herniation of the bladder and urethra into the vagina (Staskin, Zimmern, Hadley and Raz 1985).

Ligaments connect bones across joints to provide stability and limit movement. The pubourethral ligament anchors the urethra to the surface of the pubis symphysis. A distinction is made between the anterior, intermediate and the posterior pubourethral ligaments. The main support comes from the posterior pubourethral ligaments which extend from the inferior portion of the os pubis and attach mid urethra. These ligaments prevent downward and posterior rotation of the urethra. Where the anterior and posterior bands join under the arch of the pubis symphysis, the intermediate ligament is formed. The anterior pubourethral ligament attaches the region of the external urethral meatus to the anterior surface of the pubis symphysis (Zacharin 1963, Milley and Nichols 1971).

Three pairs of ligaments provide support to the uterus. Lateral support is provided by the cardinal ligaments (also known as the transverse cervical ligaments). These extend in a fan shape from the cervix and vagina to the pelvic walls. Posterior support is provided by the sacrouterine ligaments. These run backwards and upwards from the cervix encircling the rectum to attach to the anterior part of the sacrum. The pubocervical ligaments run from the cervix, beneath the bladder to attach to the pubis symphysis (Staskin et al 1985).

2.2.6 The Nerve Supply of the Pelvic Floor

The nerve supply is thought to come from two main sources; the pudendal nerve, and a direct branch from the S2, S3 and S4 motor routes (the pelvic splanchnic nerve). The pudendal nerve branches into the inferior rectal nerve, from where it divides into the

perineal nerve and the dorsal nerve of the clitoris. The perineal nerve supplies the anterior levator ani and the superficial perineal muscles. A branch of S4 innervates the posterior levator ani and the anal sphincter. It is thought the urethral sphincter may have dual innervation (Gosling 1979). The perineal nerve supplies the periurethral component of the urethral sphincter whilst the pelvic splanchnic nerve is thought to supply the intramural component.

2.3 Micturition

Micturition occurs under the control of the central nervous system. Urine filters into the bladder via the ureters in peristaltic waves. The bladder fills slowly with little increase in intravesical pressure until it becomes fully distended. The ability to fill without pressure increase is known as accommodation and results from the elastic and viscous properties of the bladder wall, which allow it to stretch without any increase in tension. Eventually the limit of distensibility of the bladder is reached and intravesical pressure rises (Walters 1989).

As the bladder becomes distended at around 250 - 300 ml, stretch receptors in the bladder wall become stimulated and convey (sensory) afferent proprioceptive impulses via the sacral roots S2 - S4. From there, impulses ascend the spinothalamic tracts and are relayed to the anterior portion of the frontal cortex. Detrusor contraction is inhibited by descending impulses to the sacral centre.

As the bladder fills with urine, stronger impulses are relayed to the cerebral cortex. These override the descending impulses and the individual registers the desire to void. The desire is suppressed by the frontal cortex until a time and place suitable for micturition has been selected. Afferent impulses from the bladder wall, trigone and

smooth muscle are able to reduce bladder contractility and increase urethral pressure (Mundy 1984).

When the decision to micturate is taken, descending efferent impulses relax the pelvic floor and urethral sphincter causing a fall in intraurethral pressure. A few seconds later the cortex and pontine centre suppress their inhibitory output to the sacral centre. Parasympathetic activity initiates detrusor contraction and urine begins to flow. The presence of urine within the urethra produces reflex facilitation of the detrusor helping sustain the contraction until the bladder is empty. Flow is aided by increased intra-abdominal pressure (Valsalva's manoeuvre) and contraction of the abdominal muscles.

Once voiding is complete, intravesical pressure falls as the detrusor relaxes and the muscles of the pelvic floor and external sphincter contract voluntarily. Any trapped urine is 'milked' back into the bladder as the urethral sphincter contracts in a retrograde manner.

2.4 The Continence Mechanism

2.4.1 Continence

Continence is the ability to store urine temporarily within the bladder with conscious control over the time and place when micturition occurs. Under normal conditions continence is maintained by a positive pressure gradient, i.e. urethral closure pressure is greater than that of bladder pressure. Continence is maintained by the sphincteric action of the vesical neck and proximal urethra. The following mechanisms perform this action:

1) the internal sphincter of the urethra, which is under involuntary control, provides continuous muscle tone. Collagen, elastic fibres and fascial attachments are intermingled with the involuntary fibres of the urethral muscle and with the striated voluntary fibres

which surround the mid third of the urethra. This complex arrangement provides the urethra with 'inherent tone' (Wall 1993).

2) the urethra enters the bladder almost at a right angle; this is known as the urethrovesical angle. When the detrusor is relaxed, a flat bladder base is maintained, the proximal urethra is contracted and the urethral walls are kept in apposition.

3) the mucosal lining of the urethra maintains closure through its adhesive force, forming a watertight seal (Zinner, Sterling and Ritter 1980).

2.4.2 The Continence Mechanism Under Stress Conditions

Under stress conditions, two additional mechanisms may serve to increase urethral pressure in order to withstand the increased force from the bladder. These are:

1) the reflex action of the striated voluntary muscle in the external urethral sphincter and the levator ani. During activities such as sneezing or coughing the levator ani muscles and the external sphincter contract without conscious effort. This acts to support the vesical neck and occlude the urethral lumen (Wall 1993).

2) the transmission of intra-abdominal pressure to the bladder and urethra. Under normal circumstances the bladder neck and urethra are positioned above the intra-abdominal cavity. Resting pressure within the urethra is greater than that from the bladder. During a sudden increase in abdominal pressure, such as occurs when coughing, almost equal pressure is transmitted both to the proximal urethra via the pre-urethral space, and to the bladder. Thus the pressure gradient between the bladder and urethra is maintained (Jeffcoate and Roberts 1952).

2.4.3 Failure Of The Continence Mechanism Under Stress Conditions

As previously stated, the main anatomic structures involved in urinary continence are the bladder, urethra, levator ani, and the fascia and ligaments providing attachments and

support to these organs and muscles. Damage or loss of function to any one of these may result in the inability to function properly during periods of increased pressure. However, this may be compensated for by any of the other mechanisms involved, and continence may be maintained during periods of increased pressure. Stress incontinence may result from any one or combination of the following:

- a) loss of muscle function,
- b) damage to the support mechanisms,
- c) loss of nerve function.

The main ways that these affect the continence mechanism are discussed below. Impairment of the pelvic floor muscles, may be caused by direct damage to the muscles or the nerves (Snooks, Setchell, Swash and Henry 1984). Alternatively the muscles may become detached from their connections. As a result the levator ani may be unable to contract during times of stress. If the reflex action of the striated muscle fibres is lost or rendered ineffective the urethral lumen may not occlude fully. The smooth muscle of the internal sphincter may lose the property of inherent tone, resulting in lower urethral closure pressure.

Pelvic floor relaxation may occur when the muscles or ligaments are weak or damaged and unable to provide the necessary support to the bladder and urethra. Under this condition the urethra falls, rotating posteriorly away from the pubis symphysis. If it becomes positioned below the intra-abdominal cavity during times of stress, pressure will be increased to the bladder but without a corresponding increase in pressure to the urethra. As a result the pressure in the bladder may become greater than in the urethra, which may, in turn, be unable to withstand the resultant force. Leakage from the urethra

may then occur. Evidence to support this theory comes from the use of surgical techniques to lift the bladder neck thus restoring continence. A number of techniques are currently in use including the Marshall-Marchetti-Krantz procedure which attaches vaginal tissue either side of the upper part of the urethra to the pubic periosteum. Stamey's procedure involves introducing a sling which loops around behind the neck of the bladder to the rectus sheaths or the iliopectineal ligaments. Birch's colposuspension lifts the bladder neck by suturing paravaginal and vaginal tissue on either side of the neck of the bladder and upper part of the urethra to the inguinopectineal ligaments.

Damage to the bladder neck supports may result in an increase in the posterior urethrovesical angle. This leads to funnelling of the upper urethra. Relatively small increases in intravesical pressure permit urine to enter the upper urethra, and leakage may occur. As with pelvic relaxation, surgery to lift the bladder neck may alleviate this condition.

The watertight seal found within the urethral mucosa may also be affected by a lack of oestrogen, which renders it less able to seal.

2.5 Aetiology Of Stress Incontinence During Pregnancy

The aetiology of stress incontinence during pregnancy is not well understood. Possible mechanisms include; hormonal changes within the body which may affect the ability of the urethral sphincter mechanism to withstand stress. It is thought that the hormone relaxin may be responsible for softening the connective tissue and ligaments during pregnancy in order to allow the baby's head to be pushed out during childbirth (Landon, Crofts, Smith, Trowbridge 1990). However, progesterone and oestrogen may also be

partly responsible for this. Higher progesterone levels may also lead to a reduction in oestrogen receptor concentration (Miodrag, Castleden and Vallance 1988).

Whilst some authors believe that stress incontinence during pregnancy is a risk factor for permanent stress incontinence following delivery (Francis 1960), other studies have shown that for many women who are symptomatic during pregnancy, the symptoms resolve following delivery (Meyer, Schreyer, DeGrandi and Hohlfeld. 1988). Conversely, women without symptoms during pregnancy may develop them for the first time following delivery (Wilson, Herbison and Herbison 1996, MacArthur, Lewis and Bick 1993).

2.6 The Aetiology Of Stress Incontinence Following Delivery

The following section will summarise the findings of studies which investigate a) the link between denervation of the pelvic floor and subsequent dysfunction b) the role of childbirth as a cause of dysfunction will be reviewed c) obstetric variables as risk factors for stress incontinence.

2.6.1 Pelvic Floor Denervation and Stress Incontinence

The link between pelvic floor denervation and dysfunction has been investigated in both histological and neurophysiological studies. Gilpin, Gosling, Smith and Warrell(1989) compared biopsies taken from the pubococcygeus muscle in a group of stress incontinent women and asymptomatic women. The results indicated that partial denervation of the pelvic floor muscle and subsequent reinnervation was associated with the development of stress incontinence. Age and parity also appeared to be associated with the level of denervation and subsequent reinnervation.

These findings have been corroborated in studies using neurophysiological techniques such as pudendal nerve terminal motor latency (PNTML), perineal terminal motor latency (perNTML), transcutaneous spinal nerve terminal latency and electromyography (EMG). PNTML, perNTML and transcutaneous spinal nerve terminal latency measure the loss of fast conducting motor nerve fibres. An increase in latency from the point of stimulation in the nerve to the muscle is indicative of nerve damage, possibly resulting in muscle weakness. The pudendal nerve innervates the external anal sphincter and pubococcygeus muscle, whilst the perineal nerve is a branch of the pudendal nerve which stimulates the periurethral striated musculature. The cauda equina nerve roots are stimulated using transcutaneous spinal nerve terminal latency which records motor latency from L1 and L4 stimulation sites to the external sphincter muscles and puborectalis.

EMG records the action potential of the muscle. A single fibre EMG electrode can focus on the activity of a single muscle fibre. Denervation of a muscle followed by reinnervation leads the ratio of muscle fibres to nerve fibres to increase. Any increase in ratio is indicative of partial denervation of the muscle.

These techniques have provided further evidence that women with stress incontinence of urine display a greater level of injury to the pelvic floor compared with asymptomatic women. Snooks, Barnes and Swash (1984) demonstrated that women with double incontinence (i.e. faecal and urinary incontinence), displayed increased PNTML and perNTML compared with asymptomatic controls. Single fibre EMG ~~and~~ increase in fibre density of the external anal sphincter. PerNTML and transcutaneous spinal cord stimulation were used by Snooks and Swash (1984) to demonstrate significant increases in spinal, perineal and pudendal nerve terminal motor latency in

women with double incontinence. In both studies women with faecal incontinence only, displayed a less marked increase in perineal terminal motor latency than women with double incontinence. This implied that the development of stress urinary incontinence was associated with damage to the innervation of the pelvic floor muscles.

In addition it was found that women with stress urinary incontinence had a significant increase in PerTML compared with age and parity matched controls (Snooks, Baddendoch, Tiptaft and Swash 1985). However, no difference was found in PNTML or stimulation of the cauda equina between subjects and controls, although some evidence of reinnervation in the external anal sphincter was found, thus indicating some degree of damage had occurred. Smith, Hosker and Warrell (1989a) also measured PNTML to the external anal sphincter, pubococcygeus muscle and external urethral sphincter. Unlike the study by Snooks *et al* (1985), women with stress urinary incontinence displayed significantly delayed conduction to all three muscles compared with asymptomatic controls.

The relationship between denervation of the pubococcygeus muscle and stress incontinence was repeated in a study by Smith, Hosker and Warrell (1989b). Single fibre EMG was performed on the pubococcygeus muscle, women with stress incontinence had increased fibre density compared to the asymptomatic controls. Other findings showed that fibre density increased with age in both asymptomatic nulliparous, and asymptomatic parous women. Comparison of asymptomatic nulliparous and parous women showed an increase in the fibre density found in the group of parous women. These findings, along with those from Gilpin *et al*'s study (1989), suggest that both age and parity are associated with increased level of denervation to the pelvic floor.

Following on from this, neurophysiological studies show that pelvic floor damage, associated with the development of stress incontinence, occurs during childbirth.

2.6.2 Effects of Childbirth

Using the same techniques a study by Snooks, Swash, Setchell and Henry (1984) examined the effect of delivery on the innervation of the external anal sphincter muscle. The study, performed 48 - 72 hours postpartum and again at eight weeks after delivery showed that women who had had a vaginal delivery appeared to have sustained damage to the innervation of the external anal sphincter in comparison to the controls. Women who had had an elective caesarean section appeared not to have sustained significant damage. The damage was most marked in multiparous women and also in those who had had a forceps delivery. By two months postpartum most women showed substantial recovery and their PNTML had returned to antenatal values. However, a number of multiparous women, although showing improvement in PNTML, had evidence of increased fibre density in the external sphincter muscle. The authors concluded that the major predisposing factors for pelvic floor damage were vaginal delivery, multiparity and forceps delivery.

A follow up study (Snooks, Swash, Mathers and Henry MM 1990), involving the multiparous subjects only, showed that pelvic floor damage was still present five years on from delivery.

Some of these findings have been corroborated in other studies. Denervation to the pelvic floor during vaginal delivery, followed by subsequent reinnervation, was also reported by Allen, Hosker, Smith and Warrell (1990), Sultan, Kamm and Hudson (1994) and Tetzschner, Sorensen, Jonsson, Lose and Christiansen (1997). They also found that

an elective caesarean section was not associated with pelvic floor damage. However, further analysis showed that women who had had a caesarean section following the onset of labour, (particularly if it had been prolonged or the fetal head engaged [Sultan *et al* 1994]) were likely to have sustained damage to the pelvic floor.

In contrast to the study by Snooks, Swash, Setchell and Henry (1984), both Allen *et al* (1990) and Sultan *et al* (1994), found no difference in the degree of damage which occurred during a forceps delivery compared with that of a vaginal delivery. Tetzschner *et al* (1997) reported that vacuum extraction was associated with a significant increase in PNTML and was therefore indicative of pelvic floor damage. However Sultan *et al* (1994) did not corroborate this particular finding. It is possible however, that this was due to the small number of women taking part in the study who underwent a vacuum extraction delivery (n = 6).

2.6.3 The Relationship Between Childbirth And Stress Incontinence

Epidemiological studies using postal questionnaires or interviews have also been used to examine the relationship between childbirth and stress incontinence.

Tears / episiotomy

The majority of studies found no association between the occurrence or degree, of tears, or episiotomy, and denervation to the pelvic floor (Allen *et al* 1990, Sultan *et al* 1994), or with the prevalence of stress incontinence (Rockner 1990, Wilson *et al* 1996, Viktrup, Lose, Rolf and Barfoed 1992). However, Dimpfl, Hesse and Schatz *et al* (1997) reported that women with a second or third degree tear had a higher incidence of stress incontinence compared to women with a first degree tear or no tear at all. Women who had an episiotomy reported a lower incidence of stress incontinence. Both relationships

did not however, reach statistical significance. Skoner, Thompson and Caron (1994) found a threefold increase in risk of stress incontinence amongst those women who had had an episiotomy or tear during delivery compared to those with an intact perineum.

Length of Labour

Whilst no association was found between the length of the first stage of labour and the development of stress incontinence (Wilson *et al* 1996), there has been some evidence to suggest that the length of second stage may be a factor. Allen *et al* (1990) and Snooks, Swash, Setchell and Henry (1984) reported that a long active second stage of labour resulted in a greater degree of nerve damage. Viktrup *et al* (1992) reported a significant relationship between the length of the second stage of labour and the development of stress incontinence. MacArthur *et al* (1993) confirmed this association. Skoner *et al* (1994) found that a long labour, i.e. one exceeding 24 hours, showed a trend (not statistically significant) towards increasing stress incontinence. In contrast, Rockner 1990, Iosif 1981, and Dimpfl *et al* 1992 found no association between length of second stage and the prevalence of stress incontinence. Likewise, Tetzschner *et al* (1997) found no association between the length of second stage and pudendal nerve terminal motor latency.

Infant Birthweight

Evidence regarding the role of infant birthweight has been conflicting. Using EMG or PNTML tests, Smith *et al* (1989b), and Tetzschner *et al* (1997) found no correlation with infant birthweight. However, Allen *et al* (1990) found that heavier than average babies were significantly associated with a greater degree of pelvic floor damage. Both Skoner *et al* (1994) and Viktrup *et al* (1992) reported a trend by which heavier babies were associated with a greater prevalence of stress incontinence, however in neither study did

this reach statistical significance. MacArther *et al* (1993) similarly reported that heavier babies were associated with higher rates of stress incontinence, a proportional increase with each birthweight category was found. In contrast, Iosif (1981), Rockner (1990), Dimpfl *et al* (1992) and Wilson *et al* (1996) did not find any significant difference between the prevalence of stress incontinence and birthweight.

Head circumference

Whilst several studies have considered the effect of head circumference the majority, (Allen *et al* 1990, Sultan *et al* 1994, Wilson *et al* 1996, Dimpfl *et al* 1992) reported no association with denervation to the pelvic floor or stress incontinence. Although the study by Viktrup *et al* (1993) did show a trend this did not reach statistical significance.

Cigarette Smoking

Bump and McClish (1992) and Tampakoudis, Tantanassis, Grimbizis, Papaletsos and Mantalenakis (1995) reported a relationship between smoking and stress incontinence (in non pregnant women). Women who currently smoke or who have smoked in the past, were more likely to suffer from the condition than women who have never smoked. This relationship was found irrespective of age, parity or weight. The mechanism which underlies this association is unclear. Explanations put forward include the effect of the smokers cough, the reduction in collagen synthesis and a reduction in oestrogen production, according to Baron, La Vecchia and Levi (1990). During pregnancy or in the puerperium the effects of cigarette smoking in relation to stress incontinence may be different due to the variation in hormone production at this time. However, Wilson *et al* (1996) reported no difference in the prevalence of symptoms between smokers and non-smokers at three months postpartum.

Exercise

Exercise is known to increase muscle size and strength thereby improving muscle function. No studies have looked directly at the effect of exercise on the prevalence of stress incontinence. However Gordon and Logue (1985) reported a significant association between the efficiency of the perineal muscles and the extent to which women took regular exercise one year after delivery. One could therefore expect to find a lower rate of stress incontinence amongst women who exercised in comparison to those who did not. Another mechanism by which exercise may affect outcome is via the length of labour. Pomerance, Gluck and Lynch (1974) reported that for multiparous women, those women who were physically fit tended to have a shorter labour. This effect was not found in nulliparous women.

Ethnicity

Mattox and Bhatia (1996) found a higher proportion of Hispanic women presented with symptoms of stress incontinence compared to white women. However, following urodynamic investigations results between the two groups were similar. Bump (1993) found that both symptoms and the diagnosed condition were significantly higher in white compared to black women. However, rather than reflecting difference in the prevalence, the results may have been indicative of differences between ethnic groups in presenting for treatment. Burgio, Locher, Zycznski, Hardin and Singh (1996) reported a significantly greater prevalence of symptoms of stress incontinence in white women compared to black women during pregnancy. The authors hypothesised that the differences were due to a relative weakness, in white women, of pelvic floor muscles. Differences in the prevalence following delivery were not examined.

A number of other maternal or obstetrical variables not yet investigated may also be associated with stress incontinence. The following section will discuss the possible mechanisms and reasons for including them in the present study.

Induced / Augmented labour

There are a number of ways in which labour may be induced or augmented. These are; premature rupture of membranes, artificial rupture of membranes, or by means of oxytocins. Premature rupture of the membranes occurs at least an hour before the onset of labour. Artificial rupture of membranes can be performed once the external os begins to dilate. It is thought this procedure causes the fetal head to descend causing great pressure on the os, which in turn creates greater nerve stimulation. This leads to stronger contractions being produced. Oxytocics (prostaglandins, oxytocin and ergometrine) cause the uterus to contract and may also, in the case of prostaglandins, alter the structure of connective tissues of the cervix, leading to ripening and effacement. By shortening the length of labour the likelihood of stress incontinence may be reduced (see above). However, accelerated labour may cause stronger uterine contractions which are more painful. (Kitzinger 1975). This may in turn affect the type and dosage of analgesia used (see below).

Pain relief

The use of pain relief during labour and delivery may have some effect on the development of stress incontinence through various mechanisms. Certain types of pain relief given during labour may increase, or alternatively decrease, the duration of labour. Ledward and Hawkins (1983 p 210) state that 'pethidine may occasionally cause a transient decrease in the frequency of uterine contractions in labour'. This may lengthen the duration of labour. An epidural may cause some women difficulties timing their

expulsive efforts with the uterine contractions. (This may also increase the risk of an operative delivery). However, a 'judicious' dose of some methods of pain relief may accelerate progress in labour, possibly by relieving the inhibitory effect of pain and anxiety. (Moir 1989). Painful labour has been associated with raised adrenaline and noradrenaline concentrations which may cause abnormal uterine contractions. Analgesia may reverse this effect. Some types of pain relief are more commonly used in operative deliveries and therefore may be associated with a higher incidence of stress incontinence, if for example a forceps delivery is used, or a lower incidence if a caesarean section is performed.

Multiple births

With a multiple birth the infants are, if carried for the same length of gestation, usually between 200 - 800g lighter than singletons (Pachulski 1990). Frequently labour occurs prior to term. The reason is not known but one factor is thought to be overstretching of the uterus. If complications arise, the delivery may be induced. The infants may therefore be more likely to be of low birthweight which may reduce the risk of stress incontinence. There is a greater risk of operative delivery, particularly for second and successive siblings which may also reduce the risk of stress incontinence.

Blood loss

Heavy blood loss during parturition may cause iron deficiency leading to anaemia. According to Wallace (1967) normal vaginal delivery was associated with an average blood loss of just under 200ml. Eighty five percent of the cases had a level of under 300ml. An episiotomy increased blood loss by 130 ml on average. An operative delivery is also associated with a heavier blood loss. Blood loss is not usually replaced as it is mostly excess haemoglobin which has been synthesised during pregnancy. However a

particularly heavy loss may contribute to a drain in iron stores especially when this is associated with anaemia occurring during the pregnancy itself. Muscle function may thus be impaired (Bentley 1985).

Breast feeding

The onset of breast engorgement coincides with a fall in oestrogens. If the woman chooses to breastfeed, oestrogen levels will remain low. Oestrogen is known to increase the hygroscopic quality of the connective tissue. When the concentration of this hormone is low, mucosa, such as in the lining of the urethral smooth muscle, is less able to provide a watertight seal (Bonnar, Franklin, North and McNeilly 1975). Continence problems may therefore occur. Another mechanism by which breastfeeding may influence continence, although in the opposite direction, is by the secretion of oxytocin. Oxytocin causes contraction of the smooth muscle. As a result, muscle tone may be improved and continence maintained.

2.7 The Prevalence Of Stress Incontinence During Pregnancy And Following Childbirth

Epidemiological surveys of the prevalence of stress incontinence show that it affects many women during pregnancy and following childbirth. However, findings vary probably as a result of methodological differences (Table 2.1).

2.7.1 Methodological Differences Between Studies

Results of incontinence surveys have been shown to be affected by the way questions are asked. Milne (1976) reported a prevalence of 12% in one population and 31% in a similar population when the question order was rearranged. Variables include: a) the response

rate, b) the measure used to assess whether symptoms are present, c) the timing of the study and d) the sample. Because of these differences it may be difficult to make valid comparisons between the studies (see table 2.1 for details).

Response Rate

Most studies have not published any information on their response rate. The following studies have provided this information: Becket (1987) 55%, MacArthur *et al* (1996) 78% and 82% for the follow up study, Wilson *et al* (1996) 70.4% and Iosif (1981) 94%. Of these, only Wilson *et al* (1996) considered the effect of non response on the data. They found non-responders were significantly younger, required less analgesia and had labours which were more likely to start spontaneously. They also had babies with higher average birthweights. However, as these factors were found not to be independently related to incontinence, the authors concluded that the prevalence would not markedly change if they had been included.

The Measure

Questionnaires and / or interviews have been used to collect data and some of the variation in the findings may be accounted for by differences in the questions and responses used. Variations may occur because of:

- i) the question used to determine whether symptoms are present.
- ii) the criteria used to measure the severity of the condition
- iii) the classification of the responses.

Studies have determined the prevalence by subjective means i.e. questioning the women about any symptoms they may have, or have had in the past, or within a specified period of time. A standard measure has not been used across the studies. Stanton, Kerr-Wilson

and Grant Harris (1980) used 'loss of urine on physical effort', MacArthur *et al* (1993) 'hard to hold urine when you jump, sneeze etc.', and Iosif (1991) 'coughing, lifting heavy objects, climbing stairs etc.'. Many (Becket 1987, Francis 1960) have not provided details of the criteria used to obtain the findings. Others have provided a description of the question but did not cite it, for example 'women were questioned about the presence or absence of stress incontinence' (Beck and Hsu 1965). Many studies have limited the question to specific activities such as coughing, laughing or sneezing, yet many different forms of physical activity trigger urinary leakage. Bo (1989) found that participation in sport or fitness activities were the main problems. If the question is limited to very specific activities a number of women with stress incontinence may give a negative answer.

Some studies have also incorporated some measure of the severity of incontinence. Again, a standard measure has not been used across studies. Criteria have included: the frequency of episodes of incontinence (MacArthur *et al* 1993), the use of sanitary protection (Wilson *et al* 1996), and the need to change underwear (Iosif 1981).

Where studies have used similar criteria to assess the severity of the condition, the wording of the question or the list of responses may be different. Taking the frequency of episodes of incontinence as an example, Sleep and Grant (1987) used 'less than once per week, once or twice per week, or three times or more per week' whilst MacArthur *et al* (1993) included 'occasionally, during some part of every month, on one or two days each week, at least once a day, and all the time'.

Timing Of The Survey

Surveys undertaken either during pregnancy or following delivery have been carried out at different stages of pregnancy or in the postpartum. The incidence of stress

incontinence was found to increase to a peak during the last few weeks of pregnancy (Stanton *et al* 1980). Surveys carried out in later pregnancy are therefore likely to have reported a higher incidence of stress incontinence than those carried out at an earlier stage. A number of studies reported that the prevalence retrospectively and thereby included any symptoms occurring during the pregnancy. Retrospective reports however, are likely to be less accurate than contemporary accounts.

Following delivery the woman's body takes time to recover and return to its pre-pregnant state. Whilst involution is occurring, the muscles of the pelvic floor also return to their pre-pregnant state, as do the softened pelvic joints and ligaments. This takes at least 6 weeks, and may be much longer in some cases. (Beischer and Mackay 1988, Wren and Lobo 1989). Studies carried out prior to 6 weeks postpartum will therefore measure stress incontinence in women whose pelvic floor muscles and ligaments are still in the process of returning to their pre-pregnant state. Studies carried out at a later stage in the postpartum will include a greater proportion of women for whom involution and the associated physiological changes have been completed

The Sample

The parity of the sample varied between the studies yet previous evidence has shown that parity is associated with the development of stress incontinence. Nulliparous women reported a lower prevalence of stress incontinence compared to parous women (Stanton *et al* 1980, MacArthur *et al* 1993), whilst women of lower order parity are less likely to report stress incontinence than those of higher parity (Wilson *et al* 1996). Viktrup *et al* (1992) included a sample of nulliparous women only, Francis (1965) reported the findings separately for nulliparous and multiparous women, whilst Wilson *et al* (1996) incorporated findings from both nulliparous and multiparous women.

Vaginal delivery is believed to be a risk factor for stress incontinence. Studies have shown that vaginal delivery may cause pudendal nerve damage and subsequent denervation of the pelvic floor, whereas a caesarean section may have a protective effect, especially if carried out as an elective surgical procedure (Snooks *et al* 1984b, Allen *et al* 1990). It follows therefore that a higher incidence rate might be expected in studies such as those by Dimpfl *et al* (1992) or Sleep and Grant (1987) whose samples included only women who had had a vaginal delivery.

Table 2.1 - Differences In Methods And Results In Previous Studies

Author	Response Rate	Measure	Timing of Survey	Point/Interval Measured	Prevalence	Sample
Becket 1987	55.7%	'whether they had suffered any incontinence in the last 3 months'	3 - 6 months postpartum	in the last 3 months	42.6%*	all women had a baby in last 3 - 6 months
* all types of incontinence						
Beck & Hsu 1965	not stated	'presence or absence of stress incontinence'	retrospective not related to any pregnancy	during any pregnancy/ following any delivery	*	all women attending continence clinic
* cannot be calculated from the information given						
Dimpfl et al 1992	not stated	'defined according to the ICS'	whilst on antenatal ward	during last 3 months of pregnancy	54%	attenders at clinic - those with prior symptoms excluded
			6 - 12 weeks	at 6 weeks & at 12 weeks	6% 6%	
Francis 1965	not stated	'questioned with regard to stress incontinence'	prospective	during pregnancy	67%	unselected women attending antenatal clinic
			up to six months postpartum	up to six months postpartum	29%	
Iosif 1981	94%	'does any urine escape during exertion for e.g., coughing, lifting heavy objects, climbing stairs etc.'	7 - 14 days postpartum	during pregnancy	23%	all maternity patients
MacArthur et al 1993	78% of those receiving questionnaire	'hard to hold urine when you jump, sneeze etc.'	retrospective 13 - 18 years after the birth	symptoms occurring up to one year postpartum	20% (at least)	all women delivering most recent child between 1987 & 1985
Stanton et al 1980	not stated	'questioned about their urological symptoms'	at intervals 32,34,36 & 40 weeks of pregnancy	during pregnancy	39% - nullips 42% - multips	women attending antenatal clinic
			postnatal visit	during postnatal period	5.8% - nullips 10.6% - multips	
Viktrup et al 1992	not stated	'whether they had incontinence provoked by physical stress'	3 - 5 days postpartum	during pregnancy	32%	primiparous women attending clinic
			3 months postpartum	following delivery up to 3 months	6%	
Wilson et al 1996	70.5%	'enquiry was made about the prevalence type and frequency of urinary incontinence'	3 months postpartum	at 3 months postpartum	24%	all women 3 months postpartum resident in the area

2.7.2 The Prevalence Of Symptoms During Pregnancy

The percentage of all women reported as suffering from stress incontinence during pregnancy ranged from 20% (Iosif 1981, Beck and Hsu 1965), 40% (Stanton *et al* 1980) to 67% (Francis 1960). These figures included women who may have had symptoms prior to the pregnancy in question. Approximately 35% of the women in Stanton *et al*'s study (1980) developed stress incontinence during pregnancy, similarly Francis (1960) found that 40% and Dimpfl *et al* (1992) 44% of women first developed symptoms during the pregnancy.

The reported prevalence of stress incontinence in nulliparous women ranged from 36% (Viktrup *et al* 1992) to 53% (Francis 1960). Three studies reported similar findings. Viktrup *et al* (1992) found that 36% of nulliparous women were symptomatic during pregnancy. This figure included 4% of women who had already had symptoms prior to the pregnancy. Thirty six percent of Wilson *et al*'s (1996) sample reported symptoms during pregnancy. Of these, 8% had had symptoms prior to the pregnancy. A similar proportion, i.e. 39% of nulliparous women, reported stress incontinence during pregnancy in Stanton *et al*'s study (1980). However, none of the women in this study reported symptoms prior to the pregnancy. Findings from Francis's (1960) study contrasted with these. Fifty three percent of nulliparous women had symptoms during pregnancy. Of these, 22% had had symptoms prior to the pregnancy.

With respect to parous women the reported prevalence ranged from 41% (Stanton *et al* 1980) to 85% (Francis 1960). These are the only studies reporting findings on parous women. Ten percent of the women in Stanton *et al*'s study (1980) had had symptoms prior to the pregnancy. In contrast, Francis (1960) reported that 34% of women had had previous symptoms whilst 51% had had none.

2.7.3 The Prevalence Of Stress Incontinence Following delivery

Following delivery, the reported prevalence ranged from 6% (Iosif 1981, Dimpfl *et al* 1992) to 20% (Beck and Hsu 1965) at six weeks postpartum. At three months there was also a wide variation in reported prevalence, i.e. 6% (Dimpfl *et al* 1992, Viktrup *et al* 1992) to 34.4% (Wilson *et al* 1996). In two separate studies Sleep, Grant, Garcia, Elbourne, Spencer and Chalmers (1984), and Sleep and Grant (1987) and reported prevalence rates of 19% and 22% at three months postpartum. However, these figures included all types of incontinence, (although the majority of women would be expected to have symptoms of stress incontinence).

The long term prevalence of symptoms was reported at just 3% in Viktrup *et al*'s study (1992) measured 12 months following delivery. Glazener, Abdalla, Stroud, Maji, Templeton and Russell (1995) reported a prevalence of 8% between 12 - 18 months following delivery, this study however also included symptoms of all types of incontinence.

One area of disagreement between studies concerned the question of whether symptoms of stress incontinence developed during the puerperium. This has implications regarding the possible causes. According to Francis (1960), no woman first developed symptoms of stress incontinence following delivery. She concluded that this indicated that stress incontinence was not caused by trauma during the birth process. Similarly, Stanton *et al* (1980 p.899) stated that 'Stress incontinence rarely appears for the first time after childbirth if it had not occurred before, during that pregnancy' yet they failed to present evidence in their study to corroborate this. In contrast, both Beck and Hsu (1965) and Dimpfl *et al* (1992) reported that 4% of women first developed stress incontinence in the

puerperium. Seven percent of women in Viktrup *et al*'s (1992) sample and 8% in Wilson *et al*'s (1996) also developed it at this time. However, the proportion of these women who had stress incontinence is not shown in the latter. In a large scale study by MacArthur *et al* (1993), 11,701 women were questioned about symptoms occurring within three months of the birth that were not experienced prior to this. Eleven percent of the sample reported the development of symptoms of stress incontinence. In conclusion, the cumulative evidence from these studies suggests that stress incontinence may develop for the first time after childbirth.

2.8 Treatment For The Condition

Stress Incontinence may be managed indirectly by controlling for factors which are known to exacerbate the condition. Weight reduction for obesity, treatment for a chronic cough, control of vomiting in pregnancy, all of these may help control stress incontinence by reducing or eliminating the 'stress' which provokes the episode of incontinence (Varner and Sparks 1991).

Direct treatment of stress incontinence involves either surgery, paraurethral injection or one of the many forms of conservative treatment. Each of these will be outlined below. The reported success rate for each of these different forms of treatment varies considerably. This may reflect similar methodological differences to the ones already discussed as well as different treatment efficacies.

2.8.1 Surgery

The aim of surgery is to lift and support the urethro-vesical junction (Black and Downs 1996). Currently there are over 100 different operations for stress incontinence which have varying degrees of success. The success is largely dependent upon whether the

most appropriate technique has been selected given the underlying cause of the condition. For this reason urodynamic testing is necessary prior to surgery, not only to confirm diagnosis of stress incontinence but also to assess the underlying cause.

Unlike treatment with pelvic floor exercises, complications may arise following surgery. Among the most serious are over correction leading to urethral obstruction and voiding problems, and under correction, i.e. failure to correct the problem at all. Other forms of incontinence, detrusor instability and urge incontinence, may occur following surgery. Additional complications associated with surgery are dyspareunia, pelvic and abdominal pain, genitourinary prolapse, migration of sutures, wound infection, urinary tract infection and fistula. The financial cost of surgery is far greater than that with treatment by conservative methods.

2.8.2 Paraurethral Injection

Paraurethral injection involves the injection of a bulk enhancing agent into the urethra as a means of providing additional resistance. There is some disagreement concerning the precise mechanism by which the implant works. Studies by Versey, Rivett and O'Boyle (1988), Eckford and Abrams (1991) and Harrison, Brown and O'Boyle (1993) found that successful treatment was associated with a decline in urine flow rate. This was thought to be indicative of outflow obstruction caused by the implantation. However, a recent study by Monga, Robinson and Stanton (1995) undertook a series of urodynamic tests to investigate the mechanisms responsible. They concluded that collagen placement occurs at the proximal urethra or bladder neck, causing elongation of the proximal urethra itself and preventing the bladder from opening during periods of stress.

Paraurethral injections are reportedly associated with few complications and unlike surgery they can be performed as day cases. The injection can be repeated as necessary and may be an effective form of treatment after previous surgery has failed. Although complications are few, there have been reports of infection, (Monga *et al* 1995) migration (Aaronson, Romei, Greene, Walsh, Hasal and Garen 1993), prolonged urinary retention and urethral obstruction following granuloma formation (Boykin, Rodriguez, Brissolara, Thompson and Zeidmand 1989).

2.8.3 Conservative Treatment

Conservative management of stress incontinence may be appropriate for women whose symptoms are not so disabling as to need surgical intervention, for those who have medical problems meaning they are high risk for complications of surgery, and for those who simply do not wish to undergo surgery. In addition, women who plan future pregnancies may not be suitable for surgery, as delivery can precipitate or exacerbate the condition.

2.8.4 Oestrogen Replacement

The urethra, like the vagina, is derived embryonically from the urogenital sinus. Oestrogen receptors are present here in large concentrations. Low oestrogen activity amongst prepubertal females rises to high concentrations throughout the reproductive years. At menopause there commences a gradual decline in oestrogen activity which is often associated with the beginning, or worsening, of symptoms of stress incontinence. Atrophic changes such as a thinning of the epithelial lining of the urethral and for blood vessel engorgement may cause a decrease in the efficiency of the mucosal seal. Studies have demonstrated that oestrogen replacement can reverse atrophic changes in the vagina. (Schiff and Ryan 1980). This particular form of treatment is aimed at

menopausal rather than premenopausal women. Oestrogen replacement would not therefore be considered a suitable form of treatment for the women in the present study.

2.8.5 Electrostimulation

Stress incontinence may be relieved by the use of electrostimulation. Plug electrodes are applied to the vagina or anal canal, or needle electrodes to the levator ani muscle or pudendal nerve. An electrical current is transmitted to the motor nerves which convey nerve impulses to stimulate the muscle fibres. If the impulses are strong enough a muscle contraction will follow (Vodusek 1997). The precise mechanism by which this acts to relieve stress incontinence is unknown.

Different types of current may be used in the treatment of stress incontinence. The two most common forms of treatment are faradism and interferential therapy. Faradism uses a series of short duration, uneven pulses to produce a contraction. Interferential therapy involves 2 currents of slightly different frequency. Where the currents pass through the same tissue 'interference' occurs. A pulse is thereby activated which is of sufficient intensity to stimulate the nerves (Laycock and Green 1988). This form of treatment can also be effective for women not able to perform a voluntary pelvic floor contraction. Once they are able to recognise a pelvic floor contraction it may be possible to contract the muscle voluntarily. Initial treatment with electrostimulation can then be swapped or supplemented by pelvic floor exercises.

Studies report few side effects although some women, for example those with excessive scar tissue, do not tolerate this form of treatment and if the electrical current is set too high some women may experience pain or irritation (Eriksen and Eikness 1989, Plevnik, Janez, Vrtacnik, Trsinar and Vodusek 1986). This may be overcome by using a

stimulating device controlled by the patient herself who can set the current at a point which is just short of uncomfortable. Treatment may be time consuming for the woman compared with pelvic floor exercises, although some devices can be used at home, and for short durations. Compared with pelvic floor exercises the treatment may be more expensive in terms of equipment cost.

Electrical stimulation is contraindicated during pregnancy.

2.8.6 Continence Devices

A range of devices have been described in the literature, including the diaphragm (Suarez et al 1991), a continence guard (Hahn and Milsom 1996) and continence control pad (Eckford, Jackson, Lewis and Abrams 1996). Each device differs with regards to shape, material, position and instruction for use, i.e. method of insertion, period of time inserted, and use during micturition / menstruation. The general principle by which the devices work is by lifting or stabilising the bladder neck, compression of the urethra, or by means of a plug mechanism (the Continence Guard). Some devices, such as the contraceptive diaphragm, lift the bladder neck and compress the urethra simultaneously.

Unlike other methods of treatment, a device will only correct the problem whilst in situ. Once removed, the wearer will usually return to her former level of continence. Consequently this particular form of treatment is a temporary solution. It may be particularly appropriate for women with a short term problem, (for example during menstruation), or women with an occasional problem such as whilst undertaking exercise, or for those awaiting surgery.

Serious side effects are not associated with this form of treatment. However, infection may occur, and, with certain devices, wearers are instructed to change the device frequently to prevent toxic shock syndrome. Wearing a device may also lead to discharge, itching, discomfort, erosion or other urinary obstruction. The device itself may be expelled. Other drawbacks include the need for dexterity to insert some devices, and some may need changing every few hours, particularly during menstruation or prior to each micturition. Financial costs associated with this method of treatment are low and the staff input required is minimal.

2.8.7 Vaginal Cones

Like pelvic floor exercises, vaginal cones are a means of re-educating the muscles of the pelvic floor. They consist of a series of weights which are of equal shape and volume. The cones are inserted into the vagina, base uppermost, with the tapered portion resting on the pelvic floor. Removal is by means of a nylon thread. Once inserted, the weight of the cone may cause it to slip out of the vagina so the muscles of the pelvic floor contract to counteract this. As the woman becomes able to retain a cone of certain weight, the next heaviest cone is used, and so on. The cones are thought to act by way of two mechanisms. First, they help the user to identify the pelvic floor muscles and thus learn how to perform a voluntary pelvic floor contraction. Secondly, in attempting to retain the cone, the increased activity of motor unit potentials strengthens the muscles themselves. An EMG study by Hesse, Vodusek, Deindel, Lukanvoc and Schuessler (1991) showed a waxing and waning motor unit activity pattern of the pubococcygeus muscle when the cone was in position.

Unlike pelvic floor exercises, vaginal cones may not be a suitable form of treatment for all women. Some women dislike using the cones. A study by Olah, Bridges, Denning and

Farrar (1990) which compared treatment with vaginal cones to interferential therapy found that some 17% of women were unable to use the cones because the cones were either too large or too small in relation to the vagina. Women with vaginal prolapse are also not deemed suitable for treatment with cones.

Reported advantages of vaginal cones are that they provide some form of biofeedback and help women to isolate and identify their pelvic floor muscles. Also, women using cones were more likely to remember to do the exercises (Haken, Benness, Cardozo and Cutner 1991).

2.9 Pelvic Floor Exercises

Pelvic floor exercises are designed to increase the tone and power of the pelvic floor muscles thereby improving continence in either or both of two possible ways. First, by restoring the tone of the urethral striated muscle, urethral pressure may be increased, and its occlusive action strengthened. Secondly, strengthening of the levator ani muscles will increase support to the urethra and bladder neck, lifting them within the intra abdominal cavity thereby improving pressure transmission during periods of stress. Support of the bladder neck may help to restore the urethrovesical angle and decrease the level of funnelling of the upper urethra (Norton 1994).

As a means of restoring continence in the type of population under review, pelvic floor exercises have the advantage of being a conservative form of treatment with no side effects. Other forms of treatment such as surgery may be inappropriate for pregnant women, or those in the postpartum or their childbearing years.

Advantages to health service providers are that the treatment may be carried out for minimal financial cost compared with the other forms of treatment. Costs may be kept low by treating women on a group basis rather than on a one-to-one basis. Again, this may be particularly appropriate to women attending primary care settings or hospital clinics such as antenatal clinics, parentcraft classes and routine antenatal and postnatal checkups.

Additional benefits, to the women themselves, of performing pelvic floor exercises include increased sensation during intercourse. According to Maly (1980) anecdotal evidence from the research 'points to the possibility that pelvic muscle exercise relieves the symptoms of haemorrhoids and vulvar viscosities by relieving the increased venous pressure' (p81). The increase in tone and control over the pelvic floor muscles can help expulsion of the foetus. Following delivery, pelvic floor muscle activity can help improve circulation and promote healing in cases where there are stitches or a tear. Stretched muscles can return to function, and nerve connections to injured muscle fibres may be re-established.

Pelvic floor exercises may also be a source of stress incontinence prevention as well as a form of treatment. The use of antenatal pelvic floor exercises in prevention of postpartum stress incontinence will be reviewed later in this chapter and this is investigated within the present study.

Pelvic floor exercises were first introduced by Kegel (1948). He described how the muscles of the perineum are put under strain during delivery, resulting in injury and loss of function. A series of exercises were devised to 'reinnervate, regenerate and re-educate' the muscles. In the paper it was stated that 'sixty four cases had been relieved

to date', although no information was provided on the number of patients treated, or whether the improvement was permanent.

Since then, numerous studies have explored the effectiveness of pelvic floor exercises. After the present study was complete, a meta analysis by Berghmans, Hendriks, Bo, Hay-Smith, Devries, Van Waalwijk and Vandoom (1998) identified 24 randomised clinical trials investigating the efficacy of pelvic floor exercises with, or without, other treatment modalities. To date, differing success rates have been reported. For example, Shepherd et al (1983) found 27% of women reported achieving continence, whilst a further 27% reported improvement in their condition. In contrast, Burgio, Robinson and Engel (1986) reported continence in 15% of the group whilst the remaining 85% reported a significant improvement. The disparity in findings between studies may be due to methodological differences, including the recommended exercise regime. As a result, comparisons between findings are problematic and it is difficult to assess the efficacy of pelvic floor exercises.

The following paragraphs illustrate variations in methodologies and the effect this may have had on the results. Differences include a) the type of study b) the measures used c) the study participants d) the instruction provided e) the exercise regime f) compliance.

2.9.1 The Type Of Study

Many investigations into pelvic floor exercises used follow up studies (Benvenuti, Caputo, Bandinelli, Mayer, Biagini and Somnavilla 1987, Cammu, Van der Meulen, 3ryne and Amy 1991, and Hendrickson 1981) As controls were not used, it is possible that any improvement or deterioration in the subjects' condition was unrelated to the programme of exercise. Other studies have employed a controlled trial, although the type of control

used has varied (Hahn *et al* 1993, Lagro Jannssen, Debruyne, Smits and Van Weel 1991, Henalla, Kirwan, Casteleden, Hutchins and Breeson 1988)

2.9.2 The Measures Used To Quantify Leakage

As in incontinence studies previously discusses, there are differences difference between studies in the criteria used to measure the severity of stress incontinence in the participants. Some studies used subjective criteria (Hendrickson 1981), (Henderson and Taylor 1987), whilst others used objective criteria (Henalla *et al* 1988, Bums, Pranikoff, Nochajski, Desotelle and Harwood 1990). Some studies, e.g. Lagro-Jannsen *et al* 1991, Mouritsen *et al* (1991) and Kujansuu (1983) employed both. Kujansuu (1983) found that results obtained by subjective measures showed a higher level of improvement following the intervention than results obtained by objective measures.

2.9.3 The Study Participants

Studies differed with respect to parameters relating to the study participants which may have had a bearing on outcome. These included status prior to participation and personal characteristics. Some studies included only women with urodynamically proven stress incontinence. Lagro-Janssen *et al* (1991) and Bo, Hagen, Kvarstein, Jorgensen and Larsen (1990) used urodynamic tests to determine incontinence status prior to entering the study. Other studies, (e.g.. Hendrickson 1981) included participants with symptoms of stress incontinence but no other tests. Some women with symptoms of stress incontinence may have had a different type of incontinence, usually that of detrusor instability. In those cases, pelvic floor exercises would not be an effective mode of treatment. With respect to personal characteristics, some studies set specific criteria for inclusion of participants. Taylor and Henderson (1986) included postmenopausal women in his study, yet Jonasson, Larsson, and Pschera (1989) recruited young women who had

recently given birth. It is possible that different groups of participants responded differently to treatment due to factors such as, suitability to the type of exercise, different levels of motivation, variations in muscle tone at the outset of treatment, or differences in hormonal levels. Sandri, Biggiogero, Fanciullacci and Zonollo (1990) reported that neither age, weight, duration or severity of incontinence influenced the response to treatment. Tchou, Adams, Varner and Denton (1988) confirmed these findings with respect to age and weight. Henderson and Taylor (1987) reported a higher rate of improvement in the group of younger women compared to those 55 years or older although the statistical significance was not reported. Elia and Bergman (1993) found no statistically significant differences in relation to age, parity, weight and menopausal status. However, women with 'mild' stress incontinence had a more favourable outcome than women with 'severe' stress incontinence.

2.9.4 The Instruction

The instruction has varied with respect to the methods used to teach pelvic floor exercises, the degree of supervision and whether a check was incorporated into the programme to ensure each participant was performing an effective muscle contraction. Research has shown that pelvic floor exercises are particularly difficult to teach correctly. Many women are unaware of their ability to contract their pelvic floor muscles and are unable to perform a correct contraction (Laycock 1987, Bo, Larsen, Oseid, Kvarstein, Hagen and Jorgensen 1987). Because of this, it would also seem important that a check is provided to ensure that the women are able to contract the correct muscles. In addition to rendering the exercises ineffective, incorrect pelvic floor contractions may, in some cases, also compound the problem. Bump, Hurt, Fantl and Wyman (1991) found that 40% of participants were unable to contract their pelvic floor following brief verbal instruction. Because of this, it would also seem important that a check is provided to

ensure that the women are able to contract the correct muscles. In addition to rendering the exercises ineffective, incorrect pelvic floor contractions may, in some cases, also compound the problem. Bearing down could, according to Laycock (1987), stretch the pelvic floor muscles. Bump *et al* (1991) estimated that one in four women in their study were using a technique that could in fact promote incontinence. One of the eligibility criteria employed in the studies by Hendrickson (1981) and Stoddard (1983) was that each participant was able to contract their pubococcygeus muscle. This was confirmed by means of a vaginal palpation. Other studies (Tchou *et al* 1988, Kujjansuu 1983) did not appear to make any check, yet it is possible that without it a number of participants were not exercising the pelvic floor muscles correctly.

Variations between studies in the level of supervision were also evident, yet again it is possible that this could have had an affect on outcome in relation to either the ability to carry out the correct contraction or compliance with the exercises (Bo *et al* 1990).

2.9.5 The intervention itself

Another factor which has lead to difficulties in comparing studies relates to the programme of instruction. Because of the differences in the study parameters it is difficult to assess the nature of an 'optimal' exercise programme. Variations included the number of contractions stipulated per session / per day, and the length of time the contractions should be held, although most studies incorporated daily sessions of frequent or sustained exercise. Kegel (1948) himself recommended a daily target of 300 contractions. Lagro-Jannsen *et al* (1991) recommended building up from five to ten sessions of ten contractions per day. Henania *et al* (1988) recommended that the contractions were held for three to four seconds with equal numbers of fast and slow for up to ten minutes and repeated every hour. Susset, Galea and Read (1990) included two

15 minute programmes per day using contraction of 5, 10 and 30 seconds. (A large number of studies did not however, state what exercises were recommended). Bo *et al* (1990) found a considerable difference in outcome according to whether study participants were enrolled in an intensive or non intensive group. Miller, Kasper and Sampsel (1994) concluded that because the ability to contract the pelvic floor muscles varies from woman to woman, any exercise programme should be started at the appropriate level for each woman. Once pelvic floor muscle strength has been built up, the exercises should be continued, albeit at a lower intensity, in order to maintain the effects.

It would appear that the exercises need to be carried out over a substantial period of time for the majority of women to obtain relief. The majority of studies which found pelvic floor exercises to be effective were carried out over a three month period (Henalla *et al* 1988, Benvenuti *et al* 1987, Lagro-Janssen *et al* 1991, Tapp, Cardozo, Hills and Barnick 1988). Participants in the study by Bo *et al* (1990) demonstrated some increase in muscle strength after one month, although those undertaking intensive exercise continued to improve over a six month period. Participants in the study by Hahn *et al* (1993) showed improvements with increased duration of training. Only after 3 - 4 months were more than half of the participants cured or improved. Some women reported improvements in stress incontinence soon after starting pelvic floor exercises. However, it is likely that the improvement occurs as a result of the women learning to contract their muscles during times of stress (Miller, Ashton-Miller and DeLancey 1996).

2.9.6 The level of compliance with the programme intervention

Only a few studies took into account the level of compliance with the programme (Tchou *et al* 1988, Lagro-Janssen *et al* 1991, Hendrickson 1981). Yet participants not complying

with the instructions could have had a negative effect on the success rate of the programme, so that the results reflected participant rather than method failure. Another important factor relates to whether information on non compliers was analysed or not. Comparisons between a study that included non compliers to one which excluded them, will not be valid.

Although many studies have considered the effect of biofeedback, as women in the present study do not receive this as routine, it will not be considered within this review.

2.9.7 The Effectiveness Of Pelvic Floor Exercises

Three studies (Henalla *et al* 1988, Lagro-Janssen *et al* 1991 and Hahn *et al* 1993) used rigorous methodologies. All employed a case control design, participants underwent urodynamic testing and they were taught how to perform an effective pelvic floor contraction. In addition, both subjective and objective measures were used to determine the severity of the condition, with the same measures used before and after the intervention. The conclusions from these more rigorous studies indicate that pelvic floor exercises are an effective form of treatment for stress incontinence. Approximately two thirds to three quarters of women embarking on a course of exercises may be expected to be 'cured' or improved, provided that the exercises are carried out effectively over a period of time. A recent review of conservative treatment for stress incontinence (Berghmans *et al* 1988) similarly concluded that pelvic floor exercises, 'if properly taught' were an effective form of treatment for the condition.

2.9.8 Long Term Results Of Pelvic Floor Exercises

A few studies have looked at the long term effects of pelvic floor exercises, mostly on middle aged women. Mouritsen *et al* (1991) followed up participants one year after

completion of a three month training programme. Cammu and Van Nylen (1995) followed participants for a five year period whilst follow up took place 'several years' after completion of a programme of exercise in Hahn *et al's study* (1993). All of these studies reported that some women were still motivated to exercise regularly, some women occasionally, whilst others were not at all. This appeared to be irrespective of their condition. No relationship was found between long term effect and frequency of exercise. In contrast, Fergusson, McKey, Bishop, Verheul and Dougherty (1990) followed up their sample by means of questionnaire 12 -24 months after the initial study. In comparison with the above findings the mean age of the women was lower (37 years - group 1 and 35.8 years - group 2) Whilst the numbers involved were small i.e. 20, the findings suggested a relationship between long term effect and continuation of exercise.

2.9.9 Pelvic Floor Exercises Carried Out In The Postpartum

A small number of studies have looked at the efficacy of pelvic floor exercises carried out in the postpartum. The results of these have been inconclusive. Becket (1987) in a study of 97 women who had given birth 3 - 6 months previously found no significant differences in the prevalence of stress incontinence amongst women who had exercised their pelvic floor and those who had not. In a large study of urinary incontinence three months following delivery, Wilson *et al* (1996) found a significantly higher proportion of incontinent women performed pelvic floor exercises compared to those who were continent. The study took into account the frequency of exercise. The authors concluded that the exercises were carried out because of the condition rather than as an 'antecedent' of incontinence. A control study of pelvic floor exercises by Sleep and Grant (1987) found no difference in the prevalence of urinary incontinence between women who undertook an intensive programme of exercise and those who followed the basic instruction given to women as routine during their stay in hospital.

A recent study by Morkved and Bo (1996) evaluated the effect of postnatal pelvic floor exercises from eight weeks postpartum. The study employed a prospective case control study design. The cases attended an eight week course on pelvic floor exercises whilst the matched controls received only the written information supplied by the hospital. Muscle strength was measured at eight and sixteen weeks postpartum. The results showed that despite the controls having stronger pelvic floor muscle strength at eight weeks, the cases showed significantly greater improvement in strength at sixteen weeks. The study therefore appeared to lend support to the idea that postnatal pelvic floor exercises are beneficial provided they are carried out in an effective manner.

2.9.10 The Role Of Antenatal Pelvic Floor Exercises In The Prevention Of Postpartum Stress Incontinence

Whilst a vast number of studies have considered the effectiveness of pelvic floor exercises in reducing stress incontinence, their use in preventing the condition has been the subject of very little research to date. Two studies by Allen *et al* (1990) and Sultan *et al* (1994) considered the role of antenatal pelvic floor exercises with respect to pelvic floor damage in the postpartum, using neurophysiological techniques. Neither study found any correlation between the degree of damage and the use of exercise at this time. However, no information was provided to show how the exercises were measured. Sleep and Grant (1987) found women who reported doing pelvic floor exercises during pregnancy were 'somewhat more likely' to have postpartum incontinence. No possible explanation for this finding was put forward, although information was not available on the frequency in which they exercised, the parity of the women, or their continence status prior to delivery.

Four more studies reported findings which appeared to contrast with those above. Henderson (1983) employed a controlled trial to assess the effect of instruction in antenatal pelvic floor exercises on the contractability of the muscles postpartum. This was measured by taking readings from a perineometer during pelvic floor contractions. The experimental group showed significantly higher mean readings when measurements were taken at 8 weeks postpartum, than the control group. Similarly, Nielsen, Sigsgaard, Olsen, Tolstrup, Danneskiold-Samsoe and Bock (1988) used a control trial to assess the difference in postpartum contractibility of the pelvic floor between a group of women training in pelvic floor exercises from 33 weeks gestation, and a control group not receiving any antenatal instruction. Both groups were given the same instruction postnatally. Readings from a perineometer were taken at 8 weeks and 8 months postpartum. At both stages, the experimental group showed significantly higher readings than the controls. At 8 months reading in the experimental group were similar to the antenatal readings. This was not apparent in the controls. Unfortunately, neither of the above studies compared the incidence of stress incontinence in these groups.

The study by Wilson *et al* (1996) looked at the relationship between antenatal pelvic floor exercises and postpartum stress incontinence by means of a postal questionnaire sent to a large sample of women at 3 months postpartum. Antenatal exercises performed daily were associated with a reduction in the prevalence of incontinence postpartum. This was not evident in women who performed them less frequently. As a dose response effect was not found, the authors concluded that recall bias may have affected the results, and suggested that a prospective study should be undertaken to verify their findings. However, it is also possible that the exercises need to be performed at this intensity to sustain any beneficial effect.

2.9.11 The Current Role Of The Health Professional Regarding Instruction On Pelvic Floor Exercise

In studies carried out to evaluate the effects of pelvic floor exercises, the instruction is usually undertaken by a physiotherapist. As previously discussed, physiotherapy is considered a viable option for the treatment of stress incontinence when surgery is contraindicated. However, women may only come into contact with the physiotherapist when the problem has become severe enough for them to be referred for specialist help. Yet the role of other health professionals such as midwives and health visitors is also significant, as they are the key professionals in contact with women during and after their pregnancy, the period when stress incontinence commonly begins. It is known that some instruction may be provided to women during pregnancy or after delivery but the extent of this practice is unclear.

Information was therefore sought from the professional bodies of three health professions as to their views, and also the current practice on the use of pelvic floor exercises during pregnancy and following childbirth to alleviate the symptoms of stress incontinence. The **Chartered Society of Physiotherapy (CPS)** had no specific guidelines or policy on this matter, nor did it stipulate how or even if the training schools have to teach this subject. The Society does however run a validated post-registration training course which members may attend. A specialist group, The Association Of Chartered Physiotherapists In Women's' Health provides advice and training for physiotherapists on antenatal care, postnatal care and gynaecological care. As a recognised clinical interest group of the CSP it is considered a *Specialist Group* and offers advice on relevant matters. As such it has published 'standards of care' in order that 'managers and physiotherapist clinicians shall have a nationally agreed and clearly defines clinical standards with

monitorable criteria for this field of care'. A number of these standards refer to the teaching of pelvic floor exercises and the promotion of continence.

The reply from the **Royal College Of Midwives** (RCM) stated 'unfortunately the RCM does not have any written guidelines on stress incontinence following childbirth'. 'Midwives are given no formal training on pelvic floor exercises, any information they need will be got from the Continence Society'.

The **Health Visitors Association** 'do recommend the use of pelvic floor exercises and encourage mothers to perform them following childbirth'. However, they suggest that clients with stress incontinence following childbirth should 'first see their GP to identify the precise cause of incontinence and to pinpoint and treat any medical condition that may be causing it'.

Thus it appears that national guidelines regarding the practice and instruction of pelvic floor exercises vary between the professional bodies. None had a specific policy that outlined routine practice. As a result, standards of care may be more dependent on local rather than national policy.

2.10 The Effects Of Stress Incontinence On The Sufferer

2.10.1 Consultation For Stress Incontinence

Despite the range of treatment available to women suffering from incontinence, the literature revealed that a large proportion of women do not seek help for the condition. Reported figures of those sufferers who do seek help range from 23% of perimenopausal women (Reykers, Drogendijk, Valkenburg and Riphagen 1992) to 35% of women aged 18+ (Holst and Wilson 1988).

Factors which may influence the decision to seek help include the age of the sufferer, the severity of the condition, and the type of incontinence. With respect to age, the findings in the literature were somewhat contradictory. Holst and Wilson (1988) reported that women aged 25 -34 years were less likely to seek help than older women. Rekens *et al* (1992) stated that 'fewer of the older women had visited a doctor' yet the figures given showed that the lowest consultation rate was for women aged 50 - 64 years whereas nearly 50% of the women aged 65 - 79 years had consulted a doctor. Norton, MacDonald, Sedgwick and Stanton (1988) reported that younger women were less likely to delay before consulting a doctor. Rekens *et al* (1992) and Holst and Wilson (1988) both reported an association between the severity of the condition and the consultation rate. Women were more likely to seek treatment the more severe their condition was perceived to be. In contrast, Reymart and Hunskaar's study (1994) found no such effect. Whilst some studies reported the prevalence of the different forms of incontinence in their sample, only one (Reymert and Hunskaar 1994) looked at whether the type of incontinence had any bearing on the consultation rate and found no statistical significant differences.

Some differences were reported in the reasons women did not seek help for their condition. The reason cited most often for not seeking help was that the symptoms were not felt to be serious enough (Reymert and Hunskaar 1994, Reykers *et al* 1992, Jolleys 1988), or that the symptoms were not abnormal (Holst and Wilson 1988). All reported that a small proportion of women felt they could not, or did not want, to talk about it with a doctor. Another reason for not seeking treatment was that women either did not know about the available treatment, or they had a low expectation of benefit from treatment. Other answers, given by a minority of women included anxiety about possible treatment, the symptoms were thought to be a usual female complaint, or part of a normal process of ageing or childbirth. Norton *et al* (1988) looked at the reasons for delay in consulting a GP for incontinence. Most women delayed because they hoped that their symptoms would get better on their own, whilst two fifths of respondents said they were too embarrassed to discuss the condition with a doctor.

To conclude, whilst there are slight differences in the findings between the studies, the evidence suggests that the majority of women do not seek help for incontinence irrespective of the type of condition. It is possible the more severe the (subjective) symptoms are, the more likely women are to seek help. Women who do seek treatment may delay for some years after their symptoms begin. Most women do not feel their symptoms are serious or 'abnormal' enough to warrant treatment.

2.10.2 The Effects Of Stress Incontinence

The following section examines literature which examined the effects of incontinence on those who suffer from it. Whilst there is a large body of literature looking at the effects of incontinence most is related only to older women and to all forms of incontinence. Little is known specifically about the effects of stress incontinence upon women in their

childbearing years. Whilst some studies did include women of younger age, no study based solely upon women in their childbearing years was found. Again, although some studies have examined differences between the various forms of incontinence, none specifically looked at the effects of stress incontinence. It is possible that the findings presented below may not therefore be particularly relevant to the present study. However, by presenting an overview of the findings comparisons can be made between the effects of urinary incontinence on a general population and the effects of stress incontinence on a population of women during and after their pregnancy.

Another difference between the literature and the present study is that the majority of studies used quantitative rather than qualitative methods to assess the effects of incontinence. This was most frequently done by the use of a rating scale such as a Visual Analogue Scale (Visnes and Hunskaar 1991) or the 'Incontinence Impact Questionnaire' (Wyman, Harkins, Choi, Taylor and Fantl 1987). Other studies (Norton 1982) used a questionnaire. Only two studies employed purely qualitative methods Dowd (1991) and Ashworth and Hagan (1993). A third study by Lagro-Janssen, Smits and Van Weel (1992) incorporated a semistructured interview which explored the consequences of having incontinence. Although the questions were open-ended, the interview followed a structured format.

General findings from the quantitative studies were as follows: A small number of women were greatly affected by their incontinence (Jolleys 1988, Lagro-Janssen *et al* 1992, Wyman *et al* 1987, Macauley, Stern, Homes and Stanton 1987). This was found to occur irrespective of the type of incontinence and predictions could not be made as to how each individual will react to the condition. This is illustrated by a quote from one of the participants in Norton's study (1982 p 13). 'I never believed a minor problem like this

could turn me into a virtual recluse'. However, most studies drew similar conclusions that urinary incontinence was not a severe disability in itself. Most women coped well with the condition although there were large differences in the ways of coping that each individual adopted.

There appeared to be some differences in the effects of incontinence according to type, severity of the condition and the age of the sufferer. A number of studies reported that women with stress incontinence had fewer psychological problems, or perceived their complaint as less of a problem than women who suffered from urge or mixed incontinence (Macauley *et al* 1987, Hunskar and Visnes 1991, Wyman *et al* 1987, Visnes and Hunskar 1991). Samuelson, Victor and Tibblin 1997, Visnes and Hunskar 1991, Hunskar and Visnes 1991 and Wyman *et al* 1987 found that those with more severe incontinence appeared to suffer to a greater extent. However Wyman *et al* (1987) noted that the degree of association was modest and that psychosocial impact has a complex relationship that is not directly proportional to the degree or severity of incontinence as demonstrated by objective measurements. This finding was supported by Norton (1982).

Hunskar and Visnes (1991) also found differences in the reported effects of stress incontinence between middle aged women and elderly women in their sample. Whilst middle aged women were troubled by their symptoms, elderly women had lower levels of dysfunction generally and seemed to 'have adapted almost totally to their stress incontinence'. Visnes and Hunskar (1991) confirmed these findings. However neither study included younger women.

The effects of incontinence were further examined in relation to a range of activities or psychological states. These can be broadly categorised into 3 groups; a) social and recreational activities, b) well being and c) self perception. Each will be considered in turn.

Social and Recreational Activities

Women frequently reported that incontinence affected their ability or desire to take part in recreational or sporting activities (Lagro-Janssen *et al* 1992, Norton 1982, Wyman *et al* 1987, Lam, Foldspang, Elving and Mommsen 1992). This resulted in abstention from the activity or feeling self conscious because of the condition. Being incontinent also placed restriction upon the type of activity which involved visiting unfamiliar places where toilet facilities were unknown or unavailable. Examples of such activities included shopping, travel which took more than 30 minutes, and going away on holiday. (Wyman *et al* 1987)). Middle aged women who had stress incontinence reported less restrictions in terms of movement and travelling compared to either the elderly stress incontinent women or any women with urge or mixed incontinence. According to Lagro-Janssen *et al* (1992 p 213) it was 'mainly the fear that other people might notice their condition that made women avoid these activities'.

A number of studies reported on the effects of incontinence in relation to sexual activity. However, there was disagreement in relation to the findings. Some studies found a strong impact of sexual activity (Lam *et al* 1992, Wyman *et al* 1987, Norton 1982) which in some instances led to abstention. In contrast, Lagro-Janssen *et al* (1992) and Samuelson *et al* (1997) found only slight effects. It is possible however that stress incontinence may have a greater impact than the other forms of incontinence (Lam *et al* 1992), particularly as leakage was commonly reported during penetration.

Well being

A wide range of rating scales have been used to consider the impact of incontinence on the sufferers well being (Gothenberg Quality of Life Instrument, Spielberger State Anxiety Scale, Crown Crisp Experiential Index, Phobic Anxiety Scale). Whilst incontinence has an impact upon physical health, studies appeared to show that it had an even greater impact on mental health. Macauley *et al* (1987) found that sufferers of stress incontinence displayed higher levels of anxiety compared with a continent population. Middle aged women suffering from stress incontinence scored high on the emotional behaviour subscale of the Sickness Impact Profile compared with elderly women and those with other forms of incontinence (Hunskar and Visnes 1991). One quarter of all incontinent women felt that their mental health was affected by their incontinence to a moderate or severe extent (Wyman *et al* 1987). Respondents in Norton's study (1982) reported more symptoms relating to mental than physical well-being. Among the symptoms reported were depression, anxiety, irritability, worry, frustration, tension and feeling 'constantly toilet centred in thoughts and activities' (p11).

Self perception

A number of studies reported that incontinence had a great impact on a woman's self perception. In particular, feelings of shame and embarrassment were common (Lagro-Janssen *et al* 1992). Incontinence was also reported to affect levels of self esteem and confidence. Nearly one half of participants in Norton *et al*'s study (1988) reported feeling 'odd' and 'different' from others as a result of their incontinence. Many respondents reported feeling less attractive for this reason. This feeling was reported as being 'typical' of the women in Norton's study (1982). Another common concern reported in the literature related to the fear of odour, leading to an obsession with hygiene. However,

stress incontinent women were less likely to report odour as a concern compared with those women suffering from other forms of incontinence. According to participants in these studies, the worst effect of urinary incontinence were the perceived smell and the embarrassment and shame. Similar answers were reported by Norton (1982), although other responses also included the worry of becoming worse in the future, and the reaction of others to the problem.

Qualitative Studies

Both Dowd (1991) and Ashworth and Hagan (1993) attempted to look at incontinence from the point of view of the sufferer herself. An important issue which emerged from both was that the women described incontinence as a social rather than a medical problem. The condition itself was seen as taboo. Because of this, sufferers found it difficult or even unacceptable to talk about it. Even 'sexual partners have little inkling of the severity or existence of the problem' (Ashworth and Hagan 1993 p1419). Dowd suggested that for many women even talking about it would pose a threat to self esteem. As a result of the taboo nature of the condition many women reported feeling unique and isolated, often feeling that they were the only person with the problem. It became of the utmost importance to them that other people were not made aware of it. Threats to this secrecy included accidents in public and possible odour. Women recalled such events as embarrassing and humiliating, leading to loss of self respect and self esteem. Dowd's study (1991) centred upon the theme of incontinence as a threat to self esteem and described strategies women used to help retain their self esteem.

Participants in Ashworth and Hagan's study (1993) which included some younger women (i.e. aged 25 -55), described how incontinence affected their self image. Some women reported how they came to hate their own bodies, others used strategies such as

dressing 'dowdily to render the body irrelevant' (p1420). Another theme related to the inevitability of the condition. Some women reported that incontinence was an inevitable consequence of mother hood. The study also revealed that women often felt that having incontinence was their own fault. They felt 'to blame' because they were not doing pelvic floor exercises, or not doing them often enough. Because of this, they believed that health professionals would reprimand them in some way and were therefore reluctant to involve the health professional with their problem.

From describing how the condition affected them, the women went on to describe coping strategies. Participants in Dowd's study who were aged between 58 -79, described three stages in the quest to retain their self esteem. These were:

- 1) Being in charge. This meant having effective continence care routines, being prepared, planning and organising activities.
- 2) Acceptance of the problem. This came with confidence in the care routine, minimising the importance of the problem and keeping it in perspective.
- 3) Normalising the condition. This was achieved through effective continence care routine which gave confidence. If care routines were ineffective or problematic then incontinence became unacceptable, providing a threat to self esteem. If incontinence was under control it became less of an issue and did not pose too much of a threat to self esteem. Some of these issues were reinforced by Ashworth and Hagan: Women described the impact incontinence had on their daily lives in terms of the precautions they had to take, and the lack of freedom associated with the condition.

To summarise the evidence from the literature, it appeared that the major area of concern for women revolved around the impact it had on their own self perception and self esteem. Much of the problem was related to fears about possible consequences rather

than actual events. Incontinence was regarded as a social rather than a medical problem. In agreement with anecdotal evidence it seemed that the taboo nature of the condition meant that women found their condition embarrassing or even humiliating at times, particularly if other people were to find out about it. Whilst a number of quantitative studies concentrated on the effect incontinence had on restricting certain activities, a large part of the restriction and isolation may be enforced, as suggested by Lagro-Janssen *et al* (1992) as a means of making sure that other people did not become aware of the sufferer's condition, rather than the need to stop activities because of the condition itself.

With respect to the population under consideration in the present study, evidence from the literature suggested that incontinence may affect those women with stress incontinence to a lesser degree than women with urge or mixed incontinence. However, not all of the evidence supported this finding and it may be that the effects of stress incontinence are as physically and psychologically wide-reaching as the other forms of incontinence, particularly for the younger sufferer. For example, stress incontinence appeared to affect sexual activity to a greater degree than other forms of incontinence. This may particularly impact on the lives of younger women. Middle aged women appeared to be affected by the condition to a greater extent than older women. It is possible therefore that younger women may be affected to an even greater extent. Given the lack of evidence to date this can only be hypothesised.

2.11 The Rationale Behind The Present Study

2.11.1 Prevalence And Associated Factors

As a result of the discrepancies in findings relating to the prevalence of stress incontinence during pregnancy and following delivery, the extent of the problem is not clear. The study therefore aimed to clarify the prevalence in a sample of women representative of all those using antenatal and postnatal services. Previous studies have investigated the role of factors which may be associated with the condition, but again the evidence was conflicting. Studies agreed that parity is associated with stress incontinence but the role of variables such as age, length of labour, and episiotomy was less clear. Clarification of the role of these factors would help further the understanding of the causes of stress incontinence and the need for possible changes in clinical practice. The present study therefore investigated the influence of a number of maternal and obstetrical factors.

2.11.2 Pelvic Floor Exercises In The Postpartum

A number of different forms of treatment for stress incontinence have been documented in the literature; in particular pelvic floor exercises appear to be suitable for women in their childbearing years. A wide range of experimental studies have been carried out and despite methodological differences between them, they appeared to show that pelvic floor exercises were an effective form of treatment. However, the few studies that were carried out looking at their efficacy in the postpartum, appeared to repudiate these findings. Unlike the experimental studies, the latter considered efficacy in the 'real world', i.e. the instruction was provided as routine and the level of compliance was undocumented. Questions were therefore raised from this as to what instruction the women are provided with at this time and its efficacy.

2.11.3 Pelvic Floor Exercises In The Antepartum

Few studies appeared to have considered the role of antenatal pelvic floor exercises in preventing stress incontinence. Whilst some studies found no correlation between exercise and the degree of pelvic floor damage, other studies indicated that they might have a beneficial effect. As this could have important implications for preventing stress incontinence it was deemed necessary to follow this up with further, more detailed investigation.

The service provision generally for women at risk of, or suffering from stress incontinence at this time was also found to be undocumented. The decision was therefore taken to carry out a preliminary investigation of service provision.

2.11.4 The Effects Of Stress Incontinence

Although it appeared that stress incontinence is common to women during pregnancy or following delivery, the effects on the sufferer are largely unknown. A number of studies have been published on the effects of incontinence yet these have usually been undertaken using quantitative methods such as a rating scale. Study participants were, for the most part, elderly or middle aged, although a few studies encompassed a broad population. Lastly, the majority of studies focused upon all types of incontinence, yet it is possible that there may be issues specific to stress incontinence. Indeed, studies that considered the effects in relation to the type of incontinence have indicated that there may be some differences. For example middle aged women were affected by stress incontinence to a greater degree than elderly women. It is therefore possible that the condition has an even more pronounced effect on younger women. An investigation into the effects of stress incontinence on women during pregnancy and following delivery using qualitative methods, was therefore incorporated into the study design.

The aims and objectives of the study were as follows:

- To measure the prevalence of stress incontinence during pregnancy and following delivery.
- To investigate the role of possible risk factors for the condition.
- To examine what services are available to women with, or at risk of suffering from stress incontinence.
- To look at the role of pelvic floor exercises in preventing and treating the condition.
- To look at the quality of any instruction provided to women during these times and to assess how effective it is.
- To examine the physical and psychological effects of stress incontinence on the sufferer.

Chapter 3

Methodological Considerations

The following chapter outlines the context of the study, a description of the types of research methods is then provided, followed by justification of the method chosen in the present study. The methods of data collection are outlined and the reasons for using each particular one in the present study are also noted.

3.1 The Context of the Study

The present study examines the condition of stress incontinence in relation to pregnancy and childbirth. The nature of the study places it largely within the field of midwifery research. The responsibility of the midwife, according to the UKCC (1986), is to provide 'the necessary supervision, care and advice to women during pregnancy, labour and the postpartum period'.

Midwifery, although a discipline in its own right, also draws upon knowledge from a range of other disciplines such as nursing, psychology, physiology, anthropology and sociology. The role of the midwife may interrelate with other health professionals who also provide care to the childbearing woman. These include obstetricians, GP's, health visitors and physiotherapists. The study will therefore also consider the role of these health professionals with regard to stress incontinence during pregnancy and following delivery.

In the past 90 years there has been a steady decline in maternal and perinatal mortality rates. This is a result of many factors but mainly due to improvements in public health, housing conditions and nutritional status as well as advances in medical science. In

conjunction with this, the maternity services have changed. Since 1970 there has been a move towards 100% hospital confinement, and now over 98% of all births take place in hospital (Bryar 1995). The care has become fragmented as women are assessed, screened and treated in specialised departments by a range of health professionals. 'Care is divided between different departments, antenatal, post and labour and midwives skills are thus divided, continuity of care is difficult to achieve', (Bryar 1995 p47). The role of the midwife has also changed and birth has become more technological with an increased involvement from obstetricians. Medical intervention has become more commonplace even though this is not always perceived as necessary or desired. Associated with these changes has been an increase in consumer dissatisfaction (Jones 1990).

A consequence of the greater input from the medical profession is that childbirth has become viewed within the context of the medical model. The medical model sees the individual as comprising different biological systems. Each system may be treated as a separate entity. The model focuses upon 'illhealth as the starting point for an analysis of the factual, organic and individual condition of a patient' (Fahey 1983 p33). Within this framework, pregnancy is treated as an illness, with the outcomes being measured in terms of mortality or morbidity. The role of the childbearing woman is that of the patient, whilst the doctors' role is one of being in charge. This model may not be an appropriate framework for the healthy childbearing woman. The alternative model considers pregnancy as a normal life event, managed by the woman herself. The role of the health professional is one of assistance and enablement, rather than control. Although it could be argued that this model is less frequently used, recent changes in the maternity services indicate a shift towards this view of childbearing.

In recent years one of the key developments of midwifery and the maternity services was the publication, by the Department of Health, of the report 'Changing Childbirth' (1993). Written by an Expert Maternity Group, it provides documentation of the limitation of present day services and suggested ways of improving them. The view that Changing Childbirth took was that the services should be women and family centred. Provision of care should reflect the wishes of the woman rather than focusing upon care from the perspective of professional groups. The report acknowledged three principles central to good maternity care. These were:

- The focus of care is on the woman to be in control and exercise informed choice regarding her care.
- Maternity services should be accessible to everyone and reflect the needs of the local population.
- Services should be responsive to the changing needs of the population. Planning and monitoring of these services should involve women themselves.

Another recent key publication was that of 'Effective Care in Pregnancy and Childbirth' (Chalmers, Enkin and Keirse 1989) which helped to publicise the need to discontinue treatments that were harmful or ineffective and to promote beneficial treatments. Many midwifery practices have evolved over the years with little or no research undertaken to evaluate their effectiveness. Traditionally midwifery knowledge has been acquired in two ways. The theory was taught in didactic fashion, as Midgley (1995) pointed out in her consideration of textbooks for midwives, whilst the practice was received via a (usually) unstructured practice style clinical training.

Whilst some of the practices which have evolved over the years may be beneficial, others have had little or no effect, or alternatively, may have been harmful. Jones (1990) gives

the example of perineal shaving which became fashionable with the advent of the safety razor. Despite evidence of a lower incidence of puerperal fever amongst women who were left unshaven, this routine continued for many years. A further example is the use of episiotomy. Originally performed by doctors, episiotomy has been performed by midwives since 1967. The liberal use of episiotomy became a standard procedure in some hospitals whilst in contrast, slight perineal tearing was considered to be mismanagement. (Wilkerson 1984). However, a large randomised controlled trial comparing liberal with a restricted use of episiotomy reported in favour of restricted use (Sleep *et al* 1984). The findings were replicated in a follow up study 3 years later (Sleep and Grant 1987).

Since the publication in 1989 of Effective Care in Pregnancy and Childbirth, two maternal and child health databases were set up to review healthcare practices in order to provide evidence to help practitioners make clinical decisions. These are the Oxford Database of Perinatal Trials and the Cochrane Pregnancy and Childbirth Database. These have helped to establish the principle of evidence based practice, currently a major issue in midwifery. Whereas previously 'theory has been generated by academics , and nursing and midwifery care is carried out by practitioners' (Houston and Weatherson 1986) the shift is now towards closing the gap between theory and practice so that sound and current research evidence is applied to 'individual patients in the right way, place and time' (Haynes, Hayward and Launes 1995).

Previous research into the field of stress incontinence has largely been carried out within the framework of the medical model. The focus has been upon the condition itself particularly the symptoms and causes. The present study seeks to locate the research within the alternative framework, whereby the woman herself is central to the inquiry. It

will consider the effects of the condition from her perspective and assess her care needs and preferences.

The literature reviewed in the previous chapter indicated that little is known about the current provision of care for women with, or at risk of suffering from stress incontinence. In the light of the recent call for evidence based practice, the present study aims to investigate current practice, to assess its effectiveness and to suggest improvements in care, if necessary.

3.2 The Methods

The background information on which the present study is built has been derived from studies using either quantitative or qualitative methods to obtain their data. These techniques are at either end of the continuum of research techniques. Quantitative research techniques are usually located within a positivist paradigm. Within this paradigm the world is stable and therefore predictable. Followers of the positivist movement study nature through the testing of scientific hypothesis and development of theories. Reality is assumed to be 'outside of human experience' (Mahoney, Thombs and Howe 1995). In contrast, qualitative techniques are traditionally associated with a naturalistic or postpositivist paradigm, whereby the world is seen as an open system. People are individuals who make their own choices and interact with the environment on a one to one basis. Reality is assumed to be a function of human experience. This has also been called a social constructionist perspective.

Some authors (Rist 1977, Smith 1983) believe that the research question is shaped by the epistemological stance taken by the researcher. Quantitative and qualitative research methods are usually located within different paradigms and whichever method is chosen

is dependent upon the world view of the researcher him/herself. An alternative stance however, is taken by those researchers who believe that choice of research methods is taken not from an epistemological stance, but for technical reasons, i.e. which method is best suited to generating the data needed to answer the research question. The present study is one of applied rather than theoretical research. The methods were therefore determined by technical reasons. The strengths and weaknesses of both methods of data collection were considered in the light of the phenomena under investigation. These are outlined below.

Whilst the two methods may be used to collect data on the same phenomenon each explore the data from a different perspective. The methods use different tools to produce an alternative form of data. Quantitative approaches 'assume the world is stable and therefore predictable' whereas qualitative approaches 'assume the world is in a dynamic state of flux' (Has and Myers 1988 p130). Quantitative methods are most usually used to test theories. They can also be used to establish causality. Tools used by the quantitative researcher are experiments, surveys, structured questionnaires. Analysis is undertaken statistically to provide numerical data. Qualitative methods cannot be used to establish causality but are a means of exploring phenomena about which little is known. Qualitative research is concerned more with generating hypotheses rather than verifying existing theories. It is also a useful way of exploring phenomena, such as human emotions, which are difficult to quantify. The qualitative research tools include observation, interviews and documents. Analysis is usually in the form of words and images in order to provide descriptive data. In addition, quantitative analysis may be used on qualitative data.

Quantitative research has been described as a 'hard science' using rigorous and reliable data which has been generated by systematic procedures. These may be checked and replicated by another investigator. To some extent findings generated by these methods may be thought of as representative of a wider population from which the sample was extrapolated. Generalisations to the wider population can be made. (However, quantitative surveys are 'often not based on random samples and even when they are, refer to highly restricted populations. Further, the consistency of findings over time is rarely given much attention' according to Bryman (1988).

In quantitative surveys the relationship between the researcher and participant may be fleeting or non-existent. This is thought to be desirable so the researcher has little personal influence over response and does not introduce bias. Quantitative methods can be used to generate information from, and about, a wide population. However, the amount of detail generated is usually limited by the need to quantify the data. Furthermore, the issues under investigation have to be decided at the outset so that the variables can be incorporated into the survey instrumentation.

In contrast, qualitative research is often described as a 'soft science' providing data that is rich and deep in description. Unlike quantitative research, findings from qualitative studies are unique to that study, there is usually no intention to generalise the findings to a wider population. Qualitative methods usually generate a rich amount of data from a small number of cases.

The qualitative researcher is not seeking to confirm his or her point of view but seeks information from the perspective of the respondent themselves. (Although, this is subject to interpretation by the researcher). As a result, the findings are presented in the

language and style of the participants themselves. The researcher may become close to the individual and views the world as a participant observer. This may result in loss of detachment. As a result, the research findings may be influenced by the relationship of participants with the investigator, yet this is thought to be a meaningful part of the research findings (Sorrel and Redmond 1995). In contrast to quantitative methods, qualitative methods do not impose any restrictions on the gathering of data. Within the flexible framework new leads may be followed up and explored, if so desired.

The research question in the present study comprised a wide agenda. The information sought is partly numerical and partly descriptive. The investigation sought to verify existing theories yet also to explore phenomena about which little is known at the present time. Both research methods were therefore be appropriate, although neither one used alone would have been able to provide all the required information. To attempt to answer the questions, the two separate research methodologies of quantitative and qualitative enquiry were needed.

Combining both methods within the study was therefore considered to be the best alternative to using either one alone. Whilst some researchers, who believe the epistemological stance should drive the research question, debate the plausibility of using both quantitative and qualitative research methods in one study, technicians see benefit in using a research strategy that integrates them.

3.2.1 Triangulation

Combining both quantitative and qualitative methods within one study provides triangulation. This was first described by Campbell and Frisk (1959) (cited in Dootson 1995) as the use of multiple measures of a phenomena in a single study. Since then,

subsequent authors have described four types of triangulation: 'data', 'investigator', 'theoretical', and 'method'. Data triangulation is the collection of data from multiple sources. Each source focuses upon the phenomena of interest. This method provides a rich collection of data which may reveal similarities and differences in the phenomena. (Mitchell 1986). Investigator triangulation involves multiple individuals collecting and analysing a single set of data. It is thought that this method helps to reduce potential bias associated with a single investigator. (Duffy 1987). Theoretical triangulation is the use of several different hypothesis or frames of reference considered within the same body of data. (Duffy 1987)

Methodological triangulation is the type of triangulation used in the present study. The literature describes two types of methodological triangulation. These are 'across method' and 'within method'. Within method triangulation is the use of one type of data collection in a number of ways, e.g. a set of different rating scales may be used to assess the same phenomena. This method tests the reliability of the data (Mitchell 1986). Across method triangulation involves using different methodological techniques to study the data. Both quantitative and qualitative techniques may be involved in across method triangulation. The methods are used to complement each other, to confirm results, and to increase the validity of the findings.

The strength of triangulation over other methods is that where a single method is not adequate to explore the phenomena, a second method may be incorporated in order to provide the necessary information. Indeed, it may be used to elaborate or explain findings that need further verification or clarification. Using different types of data may provide a cross-data validity check, whereas according to Patton (1990) p188 'studies that use one method are more vulnerable to errors linked to that particular method e.g., loaded

interview questions, biased or untrue responses'. Even where no methodological errors occur in the research design, the use of different methodologies may produce divergent results which would not have been apparent otherwise. Alternatively, where little is known about a subject, exploratory research methods may be then followed by detailed information gathering. Morse (1991) described triangulation as a 'method of obtaining complementary findings that strengthen research results and contribute to theory and knowledge development'.

As with all research methodologies, triangulation has disadvantages associated with its use. Some researchers believe that there is a problem reconciling the philosophies that drive the research question and on which the choice of research methods is based. The philosophies are contradictory to each other and therefore cannot be reconciled within a single study. (Smith 1983, Burrell and Morgan 1979).

In terms of the practicalities, using different methods in a single study may increase the time and financial costs of the project. Each method needs adequate preparation, field work, and analysis. Research expertise is needed for all methods chosen. Fielding and Fielding (1986) also suggest that extra care needs to be taken to eliminate bias. Rigor should be an important element of all methodologies otherwise bias may be increased rather than decreased. Once the data has been collected, analysis of the various data parts may prove problematic. Mitchell (p24 1986) stated that the following issues, how to combine both numerical and linguistic data, and how to interpret divergent results, needed to be resolved.

In the present study it was felt that the advantage of being able to incorporate both quantitative and qualitative techniques outweighed any disadvantages of triangulation.

Indeed, some of the disadvantages reported in the literature would either not be relevant to the present study, or, could be overcome. As previously stated, the decision regarding which methods to use has been based upon the research questions and not as a consequence of epistemological beliefs. The argument that the two methods are irreconcilable is therefore not relevant to the present study. Whilst using both methods may increase the time spent on the study, it could also be argued that attempting to gather data by a suboptimal or inappropriate method could also prove to be less cost effective in the long term. In answer to the problem of research expertise being needed in both quantitative and qualitative methodologies, the investigator has experience of working with both methodologies. Whilst agreeing that care needs to be taken to eliminate bias, it could be argued that this issue should be addressed whatever method/s is/are employed. Some of the issues regarding data analysis that were reported in Mitchell's study (1986) may not be applicable to the present study. Much of the data would be analysed and presented as a finding standing on its own. Thus there would be no need to combine data, nor interpret divergent results, nor debate the sensitivity or weighting of each method. Each section would contribute equal value to the study. Where both methods are used to collect data on the same phenomenon, in the case of pelvic floor exercises for example, the quantitative data would provide basic numerical facts, e.g. percentages. The qualitative data would provide elaboration of the meaning behind these facts. It was therefore decided to use across method triangulation in the present study.

A quantitative approach was used to provide evidence of the extent of the problem, and possible risk or associated factors. It also gave quantifiable measurement of the current practice. The qualitative approach provided information about women's perceptions of

the problem and its management. It also gave rich data on self management and compliance and uncovered concepts grounded in the women's personal reality.

Within the context of the wider research question, each specific question was be treated as a separate entity for the purpose of data collection and analysis. The methodological consideration for each is discussed below.

3.3 The Womens Questionnaire

3.3.1 The aim

The aim of this part of the study was to gather statistical data from a large sample in order to examine the prevalence and severity of stress incontinence.

3.3.2 Survey Instrumentation

A survey can be administered by the following means: mail, telephone or face to face interviews. Each of the 3 methods were considered in terms of their strengths and weaknesses. These are outlined below.

In terms of cost, mail surveys are usually the least expensive form of survey whilst telephone surveys are cheaper than face to face (Bourque and Fielder 1995). Mail and telephone surveys are also quicker to administer than face to face interviews.

With regard to response rate, face to face surveys are reported, in the majority of cases, to produce a better response than either of the other methods. According to Czaja and Blair (1996) mailed questionnaires usually have a response of between 45 - 75%, telephone interviews of 60 - 90% and face to face 65 - 95%. This may be affected by a

number of factors such as the use of reminders, call-backs, whether the topic is salient to the sample, and the design of the questionnaire.

Self administered questionnaires are usually perceived to be the best method for obtaining information on sensitive issues (Siemiatycki 1979, Aquilino 1994). However, other studies have reported that telephone and face to face surveys may produce an equally high response (Czaja 1987).

Telephone and face to face surveys may incorporate an element of interviewer bias although response bias may occur with all three methods. Participants in face to face, or telephone surveys, are more likely to provide socially acceptable responses or to answer what they think the interviewer wishes them to answer. According to Dillman (1978), certain groups of people, such as the less educated and the elderly, are less likely to respond to a mail survey. Another disadvantage of a mail survey is that there is no control over whether all of the questions are answered, or in what order.

A face to face survey may use complex questions as explanations can be provided if the respondent does not understand the question or misunderstands it. Open ended questions can also be used, with the interviewer providing prompts where necessary. In contrast, mail surveys are not appropriate for either complex or open ended questions. If a respondent does not understand the question he /she may miss it out. Open ended questions also tend to produce brief answers. The degree to which telephone surveys are suitable for either complex or open ended questions, is intermediate between the other two methods. A disadvantage of telephone surveys is that, unlike the other methods, they cannot incorporate visual aids.

Face to face and telephone surveys may be used where respondents have literacy problems whereas mail surveys are inappropriate.

3.3.3 Choice of Instrumentation

After consideration of the strengths and weaknesses of each method, the decision was taken to use a mail survey to obtain the data. The decision was based on the following factors: whilst mail surveys may produce a lower response rate than the other methods, the sample would be recruited in person when they attended the hospital. This would provide an opportunity to explain the importance of the study, why participants were being asked to take part and also to assure of the confidentiality. It was felt this procedure would minimise the problem of a low response rate.

A large sample was required for the study. The aim was to recruit 1,000 women who would each provide information at 2, and possibly 3, different time periods. If the information was gathered using a face to face interview the financial costs and the length of time needed to gather the data, would be far greater than by the other methods.

The information required was of a factual nature and only brief details were needed for this part of the study. It was envisaged that open ended or complex questions would not be needed.

A final consideration was that a mail survey would allow the respondent to complete the questionnaire at her own convenience. This was deemed important particularly for the second questionnaire which was to be administered two months after the birth of her baby.

3.3.4 Development of the Questionnaire -

Background

Epidemiological surveys carried out to investigate the prevalence of stress incontinence have shown that it affects many women during pregnancy and following childbirth. However, studies investigating prevalence at such times varied in their findings. Methodological differences between studies may have accounted for some of the variation in findings. These included the response rate, the type of questionnaire or interview used, the sample selected, and the timing of the study in relation to pregnancy and childbirth.

Questionnaires or interviews were used to collect the data. Some of the variation in the findings may have been accounted for by differences in the questions and responses used. These include:

- i) the question used to determine whether members of the study suffered from stress incontinence
- ii) the criteria used to measure the severity of the condition
- iii) the classification of the responses.

(See literature review for details)

Because no standardised measure has been used across studies to obtain data on the incidence of stress incontinence and the severity of the condition, a questionnaire was devised specifically for the study. It was envisaged that this could also incorporate additional questions as required.

Principles of questionnaire design

A well designed questionnaire allows the respondent to understand and answer the questions correctly, in order to achieve reliability and validity. These terms are discussed below.

Reliability refers to the consistency of a measure. It is the likelihood of obtaining the same results again if the question is repeated. The reliability of a questionnaire can be assessed in a number of different ways; alternate form, internal consistency, interobserver and test-retest. Alternate form repeats the question but uses a different format. The respondent should be consistent in replies to factual matters. Any inconsistency may be due to errors such as in the wording of the questionnaire, or contextual errors. Internal consistency measures how well several items in a scale vary when tested on the same sample. (Litwin 1995). Interobserver reliability measures how well two or more respondents rate the same phenomena. Test-retest reliability measures how well the responses from the same individual / group remain the same over time. It is necessary however, to ensure that differences in response are not due to an actual change over time. Within the present study a form of test-retest reliability was carried out by comparing answers from the 3 questionnaires. Questions about the prevalence of symptoms were repeated for example, allowing the respondent to say whether they have, or ever had the symptoms, and if so, when they started and when they stopped.

Validity refers to whether the test measures what it is supposed to measure. There are a number of measures of validity. For a 'comprehensive review' (Litwin 1995) of how good a measure is and thus many researchers do not consider this to be an appropriate measure of validity. Content validity is a subjective measure of how good a measure appears to be. This is usually assessed by individuals with expertise in the subject under

review. Criterion validity requires that the instrument under consideration is judged against a gold standard which measures the same variable. Construct validity is a measure of 'how meaningful the scale or survey instrument is when in practical use' (Litwin 1995). This measure of validity is usually only determined following years of experience by numerous investigators. Previous studies into stress incontinence have found that reporting of symptoms does not always correlate with a clinical diagnosis of the condition (Versi, Cardozo, and Anand 1991, De Muylder, Claes, Neven and De Jaegher 1992, Haylen, Sutherst and Frazer 1989). For this reason it is acknowledged that the present study investigated the prevalence of symptoms only. In terms of measuring the symptoms, the questionnaire was been assessed by 'experts' (see pilot study) and thus subject to a content validity check.

The response rate of a questionnaire should be high to allow for statistical power and to promote external validity. External validity is the ability to generalise the findings to other populations. If the response is low, the findings only reflect that of a subpopulation which may have different characteristics to the original sample, therefore a bias is introduced. A low response rate in a homogenous population is more acceptable because nonrespondents are not likely to differ from respondents. In a heterogeneous population a low response rate may lead to greater bias in the study findings.

There are a number of ways to increase response rate, these are discussed below under the following headings.

- 1) motivation of the respondent
- 2) content
- 3) layout of questionnaire
- 4) administration

Motivation of the respondent

Potential participants are more likely to respond if they feel that the research is valuable or salient to them. In the present study, potential participants were recruited when they attended antenatal clinic in the hospital. The nature of the research project was explained to them, as were the reasons they were being invited to take part. This also had the advantage of giving advance notice of the questionnaire, another factor which has been found to increase response rate. A meta analysis by Fox, Crask and Kim (1988) found that 19 out of 22 studies showed a higher rate of response if prenotification took place. Response may also be increased if the participant feels able to 'trust' the researcher. Studies have shown that university sponsorship may help to increase response rate as it can lend credibility to the research (Fox *et al* 1988). Participants in the present study were therefore informed the research was being carried out by Liverpool John Moores University. This was confirmed by the use of letterheaded paper. A second way of gaining participant trust is to assure the participant of the confidentiality of the study. Singer, Hippler and Schwarz (1992) reported that if the subject matter is sensitive, assurance of confidentiality increases response rate. If however, the subject matter is not sensitive, 'elaborate' assurance of confidentiality may lead to a decline in response rate. Although the present study could not assure anonymity as individuals would be followed up over time, confidentiality was assured at the time of recruitment and in each letter that accompanied the questionnaires.

Participants are more likely to respond if they feel the survey is 'personal' to them (Maheux, Legault and Lambert 1989). This can be achieved by addressing each participant by name rather than using a global term such as 'dear participant' etc. Other ways include the use of hand-written letters, names, signatures, envelopes etc. As the

present study had access to each participant's name and address, each letter was addressed to them personally.

Content

A covering letter should accompany each questionnaire explaining the nature of the research, how to complete the questionnaire and what to do about returning it. The present study complied with this. The questionnaire itself should provide specific instructions on how to answer the questions correctly and what to do if specific questions are not appropriate. The number of skips should be kept to a minimum because, according to Bourque and Fielder (1995), respondents do not follow instructions. The instructions should also be consistent throughout the questionnaire. Again, the present study complied with this.

The questions should be kept short and specific. Double barrelled or double negative questions are best avoided, as are leading questions which may lead to ordinal bias. The language used should reflect the abilities of the participants. Abstract terms, jargon and abbreviations should not be included. Closed ended questions are most appropriate for mailed surveys as they are quick, easy to process and make comparison easy. Whilst open ended questions allow spontaneity, they are more time consuming and require more effort from participants. When using closed ended questions, the list of responses must be exhaustive but not too long. The categories must also be mutually exclusive. There is however, a danger that participants may tick the first or last boxes thus causing an ordinal bias in the data.

Layout

The length of the questionnaire is important as it can affect the response rate. The literature suggests that the longer the questionnaire, the less likely it is that participants will complete it. Roszkowski and Bean (1990) reported that the response rate for a short questionnaire was about 28% higher than for a long questionnaire. This effect was confirmed by Burchell and Marsh (1992) who also found that questionnaire length affected the quality of the data. In accordance with these findings the questionnaire used in the present study was kept as short as possible, i.e. two pages for questionnaires 1 and 2, and three pages for the final questionnaire. Much of the data required for this section of the study was gathered from the medical records in preference to questioning respondents directly.

Bourque and Fielder (1995) recommend using a vertical format as a horizontal format increases the errors made by respondents. Print should be of a readable size and contrast well against the paper. Emphasis should be in bold type and instructions presented differently to the questions. The present study complied with these recommendations.

Administration

Studies have reported an increase in the rate of returns when using hand written envelopes as opposed to labels (Nederhof 1983). However, due to the intensive labour that would be required to undertake this task, the present study used pre-printed labels instead. Bourque and Fielder (1995) recommended that follow up should be between 10 days and 2 weeks. No more than 3 or 4 reminders should be sent as the response peaks at this number. Reminders were sent 2 weeks after the initial posting in the present

study. Initially, a third reminder was sent by postcard 2 weeks later but had little effect on the response rate. For this reason, it was discontinued.

3.3.5 The pilot questionnaire

A pilot study was carried out in accordance with recommendations made in the literature. The aim was to locate any problems which could occur during the actual survey, to assess and implement any changes that were needed, and finally to check that there were no further problems. In particular, there should be a check to ensure the target sample was appropriate, that key issues were included in the questionnaire, and that the questions could be understood and answered correctly.

According to Oppenheim (1992), respondents in pilot studies should be as similar as possible to those in the main study. The present study was designed so that participants were questioned at 3 different stages in their pregnancy and the postpartum. These were: 36 weeks of pregnancy, 8 weeks postpartum and one year after the birth. Time constraints made it impossible for the pilot study to follow this framework. It was therefore decided to access 3 different groups of women, each group would be at one of the above stages in their reproductive lives.

3.3.6 Sample size

The aim was to recruit 1,000 women to the study. The size of sample was chosen for the following reason. The study followed up a subsample of women who reported stress incontinence following delivery, in order to investigate how they were affected by the condition, and to determine the prevalence of the condition in the long term. Previous studies of stress incontinence following delivery reported a prevalence ranging from 6% (Dimpfl *et al* 1992) to 29% (Francis 1960). The assumption was made that a prevalence

of only 6% might be found. If 1,000 women were recruited at the start of the study a minimum of 60 women would be available to follow up in the longer term.

3.3.7 Sampling methods

The study was designed to be representative of the general population of women using antenatal and postnatal services. All women were therefore included in the study, irrespective of their background or obstetric history, when they attended hospital for their first antenatal visit. This was usually at booking, or if they had previously been booked in the community, for an ultrasound scan.

3.4 Medical Records Information

3.4.1 The Aim

The aim was to investigate the possible risk or associated factors for stress incontinence.

3.4.2 The Survey Instrumentation

The medical record of each participant contained information about their obstetric history and details of the birth. Some of the variables considered in the present study had previously been examined in other studies. Many of the findings conflicted. The following variables were therefore included in order to provide clarification of any association with the development of stress incontinence. These were:

- age at delivery
- parity
- cigarette smoking
- mode of delivery
- length of labour

- tears / episiotomy
- head circumference of the infant
- infant birthweight

It was thought that a number of other variables may also be associated with the development of stress incontinence during and after pregnancy, yet these have not been investigated to date according to the literature, and so were incorporated into the present study. The variables were as follows:

- ethnic group
- pain relief
- multiple births
- induced / augmented labour
- breast feeding
- blood loss

There were a number of issues which arose in relation to the use of medical records in the current research study. As a a method of data collection specific issues may arise with the use of medical records. Permission to obtain information from case notes must be granted by each individual whose notes are required. In the present study, whilst each woman who initially agreed to take part in the research signed a consent form allowing access to her notes, according to the Ethics Committees access would not be allowed if the women failed to return any questionnaires. This meant that data was unobtainable on non responders. It was therefore not clear whether there were any differences between responders and non responders which may bias the results. (However, other tentative conclusions were drawn about the data using alternative sources of information). With hindsight it would have been useful to put forward a case to the Ethical Committees for

obtaining all medical case notes in order that comparisons could be made between responders and non responders.

Other issues involving the use of case notes relate to the quality of information. Whilst some hospitals predominantly use computerised medical records others still favour hand held notes. In some instances hand held notes may be missing or unobtainable at the time needed. In addition, obtaining the notes may be the duty of the medical records staff rather than members of the research team. As this will add extra work to the medical records staff it is important that they should be consulted and permission granted prior to commencement of the study. The quality of the information may vary depending upon the individual recording the information. Some information may be missing for specific variables whilst other information, particularly subjective information may be unreliable. (This is discussed in greater depth in Chapter 9).

3.5 The Health Professional Questionnaire

3.5.1 The aim

A search of the literature revealed a lack of information on the current health care provision for women with, or at risk of suffering from stress incontinence during, or soon after pregnancy. It was decided that this should be investigated within the present study. Although information on the services was also being collected from the women themselves via the questionnaires and interviews, it was thought that those providing the services should also be questioned. Comparisons could then be made between the two sets of data to ascertain whether they confirmed or contradicted each other.

3.5.2 The Choice Of Survey Instrumentation

A questionnaire was chosen in preference to a qualitative interview because of the information and the sample size required. Although the study was exploratory (in the sense that no information was currently available), the information required was specific and factual for the most part, and therefore suitable to be obtained by means of a questionnaire. It was hypothesised that individuals, even from within the same profession, may provide different levels of care. A large sample would be needed in order to investigate this. A postal questionnaire was chosen in preference to a telephone or face to face administered questionnaire so that it could be completed at the respondents' convenience.

3.5.3 The Development of the questionnaire

A questionnaire was designed specifically for the present study as there was no tool available from which to gather all of the required data. An important requirement of the questionnaire was that it would be applicable to a wide range of health professionals, some of whom would provide specialised care, whereas others would not. To facilitate response rate the questionnaire was designed to be completed in a short space of time. This involved ensuring it was short in length and easy to answer. The questionnaire was therefore composed mainly of closed questions each with a set of responses provided. The respondent had to indicate the appropriate response by ticking the required category. Some open-ended questions were incorporated to ensure that respondents were given the opportunity to add additional information, or to provide a different response, if their response did not fit into a response category.

The questionnaire was designed to collect data from the health professionals on the following topics:

- their profession
- when in the pregnancy or postpartum they provided care
- whether they sought information about the continence status of the women
- the services they provided for women with stress incontinence
- their satisfaction with the service provision, and ways of improving the service
- the instruction they provided on pelvic floor exercises
- their satisfaction with the above programme of instruction, and ways of improving the instruction

3.5.4 The sample

The aim was to collect information from a range of health professionals involved in the care of women during the antenatal and postpartum periods. A list of the professions involved in antenatal and postpartum care was compiled. From the list the following professionals were chosen as being relevant to the study. These were: GP's, practice nurses, midwives (both hospital based and community based), health visitors and physiotherapists. Because comparisons would be made with the information collected from the sample of women and the health professionals, the professionals were recruited from within the same districts. Due to the large numbers of health professionals employed in both districts the decision was taken to sample a small proportion of staff from each of the districts. After due consideration, it was decided to aim for a response from 50 individuals in each of the different professions. The sample should also comprise half from each district. It was felt the size of sample would be sufficient to obtain an "overall" picture of the services provided by each of the different health professions. Because the small number of physiotherapists working in the field of obstetrics, all were sent a questionnaire.

3.6 The Interviews

3.6.1 The Aim

The aim of the interviews was to collect data exploring the effects of stress incontinence on women during their pregnancy and following delivery and the provision of care at this time.

3.6.2 The Survey Instrumentation

The interview has been described as 'a conversation with a purpose' (Robson 1993 p228). It is initiated by the interviewer in order to obtain specific information about a particular subject. Unlike conversation the interview is not an equal partnership between two or more people, but rather the interviewer defines the situation and retains some element of control.

The purpose of the study determines how the interview is carried out. If the aim is to generalise findings to a large population then the interview has to be conducted using a fixed format. If the purpose is an exploratory study, the interview may be carried out using a semi or unstructured format. With regard to sample size and characteristics, Kvale (1996) suggested that the interview should be conducted with 'as many subjects as necessary to find out what you need to know' (p.101). ...'if you want to predict then you need a representative sample, if the purpose is to understand the world as experienced by one specific person, this one subject is sufficient (p102)'. Unless a representative sample is required to allow generalisations to a wider population, participants should be selected to maximise the richness of information available on the subject. This may involve using one or more of a variety of sampling methods, e.g. deviant cases, criterion case, maximum variation.

Interviews may be conducted on a one to one basis, or alternatively with a group of people. The latter is known as a focus group interview. The focus group usually involves up to 8 (or sometimes 12) people who discuss a set topic under the direction of the moderator. Although the research focuses on the issues raised by the participants, the group dynamics and interaction of the members of the group are also of interest. A group interview may produce a different perspective than would be found by means of an individual interview which covers the same topic. This may be due to the dynamics of the group. Participants may modify what they would normally say, or would like to say, because of the social situation. Alternatively they may feel particularly motivated to voice their opinion especially if they find their views are shared or reinforced by others. Opposing views within the group may also lead to a detailed or heated discussion. Focus groups also have an advantage over individual interviews by providing data from a large number of people over a short space of time. Disadvantages associated with focus groups include the difficulty in following up the views of individuals in the group. There may also one be or two individuals who dominate the conversation whilst other members opinions remain unheard. Group dynamics may also affect what is said and not necessarily reflect the true opinions of the members.

Semistructured or unstructured interviews have a flexible and adaptable approach to obtaining information. It is possible to pursue the answers provided in detail, or to follow a new line of enquiry altogether. Misunderstandings may be clarified, or explanations provided where the question or response has not been understood. Interviews may also use non-verbal cues, such as the tone of voice or a facial expression to help understand what has been said. The interview allows the respondent to express their personal feelings and thoughts using their own language. By enabling participants to respond on their own terms rather than using a set of predetermined responses, a richer set of data

may be forthcoming. Issues important to the respondent may emerge, rather than the issues that the interviewer perceives to be important.

In qualitative interviews the interviewer is seen as the 'tool' of the interview. The success of the interview may depend largely on the interviewer's skill, and the rapport between the interviewer and interviewee. This requires 'sincerity, co-operative mutual disclosure and warmth' (Douglas 1985). If there is little or no rapport, the interviewee may be uncommunicative, not wishing to share information especially, if it is personal or involves talking about a sensitive subject.

Compared to other methods of data collection, the interview may be a time consuming means of gathering data, particularly if the sample is spread over a wide geographical area. Turning the raw data into the finished product may be a long and difficult process. This usually involves transcription of either notes or tape recorded interviews. May (1993) estimated that the length of time to transcribe a tape recorded interview is 1 hour of interview to 8 or 9 hours of transcribing. Analysis of qualitative data, particularly unstructured interviews, can be a difficult and time consuming process.

The interview can be differentiated according to the degree of structure involved. All methods incorporate some degree of structure but the literature commonly describes 3 main forms of interview which are all at different points on the same continuum. At one end is the structured interview. This employs a set of predetermined questions and responses. Each respondent is asked the same question in the same way and the question carries exactly the same meaning. In this way responses are comparable across the sample and can be categorised accordingly. This type of interview is suitable for gathering factual information and generalising findings to a wider population. It is not

suitable for exploring subjective phenomena, such as emotions, because of the difficulty in categorising them so that all aspects are covered and have meaning for the interviewee.

The semi-structured interview utilises techniques from both structured and unstructured interviews. Whilst a series of predetermined questions are used, the interviewer is free to modify the questions, include additional ones, or change the question order. Interesting leads may be pursued in greater depth. Open ended questions may be used to explore issues from the point of view of the interviewee. This method allows respondents to answer more on their own terms than the structured interview, but still provides some structure for comparability.

The unstructured interview is based around a set topic but the respondent is free to talk about whatever they feel is relevant within this framework. This form of interview is the most naturalistic. Under the generic heading of the unstructured interview there are a number of different approaches such as phenomenology, ethnography or grounded theory, which may be employed according to the purpose of the interview.

As the interview becomes less structured, the less the interviewer's own ideas and meanings are imposed on it. Instead the understandings and experiences from the point of view of the interviewee him / herself are explored. The interviewee is encouraged to talk about the subject using his / her own frames of reference. If the respondent veers off to another topic during an unstructured interview the interviewer may choose not to redirect the respondent, but may instead try to understand the significance of what has been said. 'The connections between events which the informant makes have to be understood by the researcher in their natural context. Apparently disconnected recollections in an

interview can be especially revealing of what the informant holds to be significant to him / her' (Wilson 1996 p114)

Whilst the initial preparation needed for an unstructured interview may be less time consuming than for a more structured interview, the level of skill required by the interviewer is greater. Rather than ask a fixed set of questions, the interviewer has to encourage the respondent to talk openly. The less structure the interview has, the more difficult it is to analyse.

Unlike the findings from a structured interview, those from a semi or unstructured interview cannot be generalised to other populations but are only applicable to the immediate population. For this reason unstructured and semistructured interviews are used for exploration rather than prediction. Interviews carried out by different interviewers using the same interview schedule may not produce reproducible results. This may be due to the interaction between respondent and interviewer. 'It would be naive to think there exists a 'true' response to any given question because every reply is an artefact produced by the particular interviewees interaction with a specific respondent in a given context' (Wilson 1996 p117).

Unlike structured interviews, semi or unstructured interviews do not adhere to a stringent set of rules regarding rigor. According to Sandelowski (1986 p27) qualitative research methods have been criticised for 'failing to achieve or to make explicit rules for achieving reliability, validity and objectivity - criteria of adequacy or rigor in scientific research'. However, putting qualitative research within a scientific framework may not be appropriate because of the different purpose and methods of the study. As a result, some authors (Guba and Lincoln 1981, Sandelowski 1986) have reconceptualized the issues of

rigor and suggested ways of achieving these in a qualitative study. Whilst a quantitative study strives for validity, credibility or truth value has been suggested as the more appropriate measure to aim for in a qualitative study. A study is deemed credible if it 'reveals accurate descriptions of individuals' experiences' (Appleton 1995 p995) and that 'people having that experience would immediately recognise it from those descriptions or interpretations as their own' (Sandelowski 1986 p30).

The external validity of a qualitative study is measured by the generalizability of findings and the representativeness of participants, tests and testing situations. This may not be appropriate to a study that is designed to explore and search for meaning rather than truth. Guba and Lincoln (1981) suggest that 'fittingness' is a more appropriate measure than generalisation. Fittingness is the degree to which the study findings 'fit' contexts outside the current research situation.

Strategies to achieve credibility and fittingness include repeated checking of the coding and examples used, and the representativeness of the whole data to the population sampled. Also, ensuring that the findings contain both typical and atypical events, or trying to discount or disprove the conclusion. Another common way of checking credibility is to include member participation. The study is taken back to participants to see whether they agree with the findings.

Reliability may also not be an appropriate measure to test for rigor in a qualitative research study. Guba and Lincoln (1981) suggested that 'consistency' of the findings may be a more appropriate measure. A definition of consistency is that 'any reader or another researcher can follow the progression of events in the study and understand their logic' (Sandelowski 1986 p34). This can be measure using an audit trail,

i.e. laying out the information in such a way as to enable the reader to follow the decision making process, so that he / she can arrive at a similar conclusion.

The issue of rigor in qualitative studies has been reconceptualised so that more appropriate strategies of assessing the trustworthiness of the study can be implemented. Some of these methods may be problematic, as both researchers and participants may interpret different meanings from the same data. Controlling for rigor may however be contrary to the nature of qualitative studies. Kvale (1996 p252) argues that 'a pervasive attention to validation can be counterproductive and lead to a general invalidation'..'the more one validates the greater the need for validation''ideally the quality of the craftsmanship results in products with knowledge claims that are so powerful and convincing in their own right they carry the validation with them , like a strong piece of art'.

3.6.3 Principles Of Interviewing

The techniques used in conducting an interview are outlined below: The interview should begin with an introduction or briefing to explain the purpose of the research and the role of the interviewee, so that he / she knows what is expected of them. Assurances of confidentiality should also be made and permission obtained to record the interview. The briefing also serves the purpose of helping to build up rapport before the interview commences.

The interview is recorded, either by using a tape recorder, or by making notes. It is important however that when taking notes, everything that is said is noted down verbatim, so that no misunderstandings occur. Additional notes should also be taken to set the scene and record any relevant non verbal information.

The interview itself should begin with general, easy and non threatening questions as a warm up. This leads on to the main body of the interview which covers the more detailed questions. A series of closed questions, open ended questions, probes and cues may be used by which to elicit information from the respondent. The questions should be put forward in a clear, non threatening way. Long or double barrelled questions should be avoided, as should ambiguous questions. Presumptions should not be made and hypothetical questions should be avoided. Some researchers (Robson 1993, Hoinville and Jowell 1977) warn against using leading or biased questions, although Kvale (1996) suggests that they are necessary parts of many questioning procedures. For example they may be deliberately posed in order to obtain information they suspect is being withheld, they may be used in a reliability check, or they may clarify the interviewers' understanding of the phenomena.

Open ended questions enable the respondent to reply in their own terms. They may also provide unexpected answers. If the questions are phrased naturally the interview may flow as a conversation. Apart from direct questions, there are a number of other ways to elicit further information from the respondent. These include using probes and non verbal cues. Forms of probing include repeating back part or all of what has just been said, asking questions such as 'anything else'? or alternatively using cues such as 'so..' 'and...' etc. An interviewer can also make use of non verbal cues to encourage the respondent to talk. A period of silence may also lead the respondent to continue the conversation.

The interviewer should appear impartial and have the ability to build up a rapport with the interviewee in order to allow the exchange of information. The skilled interviewer will also be able to listen carefully not only to what is said, but also to the way it is spoken, and interpret the meaning from this. Another interviewing skill is the ability to note visual

cues, as information may be passed using non verbal means of communication such as facial expressions or gestures. The interviewer should be able to interpret the meanings of these correctly, or to pursue a line of questioning in order to clarify the situation.

As the interview itself finishes there should be a few straightforward questions asked in order to diffuse any tension that may have been created. The interviewer may ask if there is anything else the interviewee would like to add, or to ask. Once the interview itself has been completed, the interviewer should provide some form of feedback for debriefing or closure purposes. This may be to reiterate or clarify the main points of the interview or to state how valuable the interviewees contribution has been.

3.6.4 Development of the Interview Used In The Present Study

A review of the literature on stress incontinence showed that there were specific areas where information was unavailable. These were a) the effects of stress incontinence on those suffering from the condition and b) the services provided for those with, or at risk of suffering from the condition and c) pelvic floor exercises. It was therefore decided to conduct a series of exploratory interviews with women who had symptoms of stress incontinence in order to explore these issues.

Factual information was required from all participants to find out what care was available, and whether pelvic floor exercises were taught, how and by whom. Therefore a number of specific questions were devised. As it was anticipated that the answers would vary across the sample it was decided not to follow a fixed format but to use a flexible approach to enable these replies to be followed up as appropriate. This approach would enable the women to concentrate on those issues they felt to be important and allow the

interviewer to follow up new areas of information. The questions would be asked if appropriate, or missed if not. A series of prompts were added to help tease out more information if the respondent was not forthcoming. Whilst the interview itself was flexible, the order of the topics was predetermined. The section which concerned the effects of stress incontinence was left until last as it was thought that some women may find it difficult to talk openly about their condition.

3.6.5 Piloting

A pilot study was not undertaken as the interviews were designed to be exploratory and not follow a rigid format. Changes were made to the interview as and when it were deemed necessary. New information and ideas were pursued through the sequence of interviews whilst questions eliciting a poor response were dropped. One specific question was incorporated into all of the later interviews. This asked about the improvements needed in the care of stress incontinent women, or the teaching of pelvic floor exercises. Overall, the three main topics remained the same throughout the interviews.

3.6.6 The Proposed Sample

The aim was to interview a sample of women who had symptoms of stress incontinence following delivery or at one year postpartum. Information on the presence of symptoms at eight weeks postpartum and one year following delivery was obtained from the returned questionnaires 2 and 3. The size of the sample was not determined at the outset. It was decided to interview until saturation point occurred. However, it was acknowledged that women from both hospitals, and with a range of severity with regard to their symptoms should be included. It was thought that these factors may influence the women's experience of having stress incontinence and the care they subsequently received for it.

Chapter 4

Methods

In this chapter the method for each of the 3 parts of the study: prevalence and associated factors, health professional's views and impact of incontinence, is outlined. In each section the pilot study is described first, followed by details of the sample, procedure and analysis.

4.1 The Study Of Prevalence And Associated Factors

4.1.1 The Pilot Study

Questionnaire 1 was administered to a group of women attending antenatal clinic in a local hospital. Twenty five questionnaires were given out of which twenty three were completed and returned. Questionnaire 2 was given to women attending a health visitors clinic soon after the birth of their baby. Attendance at the clinic was poor and necessitated three separate visits. A total of ten questionnaires were given out, all of which were handed back completed. Because the questionnaire, administered by the researcher, was completed whilst the women were sitting in the clinic waiting room, it was possible to observe the ease with which they answered the questions, the length of time it took, and also to discuss any difficulties that they had in completing the questionnaire. It was envisaged that in the main study, questionnaire 3 would be completed one year after the birth of a baby by women ~~who had stress incontinence~~ at eight weeks postpartum. There were difficulties in accessing ~~a population who~~ were known to be stress incontinent at eight weeks postpartum. In addition, the hospital where the pilot study was carried out, could not divulge the names and addresses of women who had a baby one year ago.

The questionnaire was therefore piloted on a group of women who had a baby in recent years and were attenders at the continence clinic. This resulted in the questionnaire only being completed by women who had stress incontinence. A total of fifteen questionnaires were given out by the continence advisor, of which thirteen were returned by post, to the researcher.

A number of changes were made to the questionnaires following the pilot study. The information that women were given on pelvic floor exercises had not been included on the pilot questionnaire but were thought to be important. Three additional questions were therefore added to all 3 questionnaires. These were 'Have you been given any information or instruction on pelvic floor exercises?' 'Who gave you the information or instruction?' and 'How was the information or instruction given to you?'. An additional question was included in order to find out if the women had received any information about pelvic floor exercises at an antenatal class.

One additional change was made to questionnaire 2. The responses to the question 'when did you first start to do pelvic floor exercises?' were altered. The pilot questionnaire had not included a response for those women who had only started to do pelvic floor exercises since the birth of their baby. The responses covering each trimester of pregnancy were also merged and replaced by a single category 'during pregnancy'.

A number of changes were made to questionnaire 3. The instructions were revised and enclosed within a border in order that they would be more noticeable. A number of questions were re ordered so that it was easier to follow the skips. The open ended questions 'who gave you help or advice?' and 'what help or advice were you given?' were made into closed questions. A number of women in the pilot study did not answer the

last question, even though they had reported that they had been given help or advice. It was envisaged that a closed question listing all the main types of help available would produce a better response. Three further questions were added in order to ascertain if the women were referred on for further treatment and if so, who to, and what help they were given.

As a final check, and also to assess the content validity, all three questionnaires were sent to a group of 10 midwives / or lecturers in midwifery, and also the continence advisor from the local hospital. Some further improvements were suggested: as some women have a problem with leakage during sexual activity this was added to the list of activities associated with leakage. The wording was changed on the question 'how often do you exercise the pelvic floor?' to 'how often do you do pelvic floor exercises?'. 'How many times per day do you manage to do a group of contractions?' was altered to 'how many times per day do you manage to do a group of pelvic floor exercises?' as it was thought that some women would not be familiar with the term 'contraction' in this context.

The final questionnaires are shown in appendices 4, 5 & 6.

4.1.2 The Main Study

Sample

The decision was taken to exclude anyone under the age of sixteen from the study. This was due to the issue of having to get parental consent as well as that of the participant.

Following the granting of approval from appropriate Ethics Committees, women were recruited to the study when they attended the antenatal clinic in two hospitals in the North West of England. Each woman attending the clinic during a five month recruitment period, was presented with an information sheet outlining the research, and invited to take part. If she agreed she was then asked to sign a consent form which granted permission accessing her medical records. However, this was done on the agreement with the Ethics Committees on the understanding that women who did not return the questionnaires had subsequently changed their minds about participating and therefore their medical records were not accessed.

Five hundred and ninety five women out of six hundred and two approached at Hospital A agreed to participate (98.8%). At Hospital B, four hundred and thirteen women out of six hundred and eighty nine women provided written consent (59.9%).

Whilst it was not possible to gather any data on either the women who initially refused to participate, or those who agreed to take part but subsequently did not return their questionnaire, a comparison of data on the births of women was made between those in the study with those attending the hospitals over a one year period. This showed similarities between the two groups.

Table 4.1 - A Comparison Between The Type Of Delivery

	All women	Study participants
Vaginal delivery	71.4%	69.3%
Forceps / ventouse	9.9%	11.7%
Caesarean section	18.7%	19 %
Twin births	1.4%	1.1%
3+ births	<1 %	0 %

The characteristics of the sample, taken from the medical records on completion of questionnaire 2 (n = 573), are outlined below.

Table 4.2 Characteristics Of The Study Participants

Age Range - 16 - 45

Mean - 28.9

Standard deviation - 5.44

<u>Parity</u>	<u>No.</u>	<u>Percentage</u>
One	243	42.4
Two	182	31.7
Three	88	15.3
Four	26	4.5
Five	7	1.2
Six	2	0.3
Seven	4	0.6
Eight	1	0.1
Ten	2	0.3
Missing information	18	3.1

<u>Ethnicity</u>	<u>No.</u>	<u>Percentage</u>
White	515	89.8
Black	9	1.5
Asian	17	2.9
Missing information	32	5.6

Procedure

Questionnaire 1 was not sent initially to any woman if there was any doubt over whether she was still pregnant at thirty four weeks gestation. Checks were made either via the computer or her case notes. If subsequently a live birth was recorded, a copy of questionnaire 1 was posted along with questionnaire 2 at eight weeks postpartum.

Questionnaire 1 was posted out at thirty four weeks of pregnancy. A reminder was sent out 2 weeks later, (subject to a second check). Thirty four weeks was chosen as the optimal time to send out the questionnaire. Symptoms have usually developed by this stage of pregnancy, yet this would also ensure the majority of women delivering prior to term would still be included in the sample.

Questionnaire 2 was not sent if a stillbirth or neonatal death was recorded. This questionnaire was posted at eight weeks postpartum, a reminder was sent two weeks later. Eight weeks was thought to be the optimal time for administering the questionnaire. A large proportion of women should be restored physiologically to their pre-pregnant state. In addition, it should promote easy recall of events regarding current practice of the midwifery service, the health visiting service and the postnatal check up by the GP.

Questionnaire 3 was sent only to those women reporting symptoms of stress incontinence at eight weeks postpartum. This was administered one year after the birth of the baby. This was to allow as long a time as possible to elapse since the birth of the baby in order to identify whether stress incontinence resolved itself soon after the birth, began following delivery, or remained a long term problem. The time scale of the study did not allow the follow up to be carried out any later than this.

4.1.3 Medical Records Information

Information was taken from the medical records of those women who returned questionnaires 1 and 2, in accordance with the Ethics Committees. The aim therefore was to access information from the records of 573 women. However in a few instances ($n = 20$), the medical record was unobtainable. In other cases, information was missing with regard to specific items.

A form was devised on which to record the relevant information. A copy of this is shown in appendix 8. Following the return of questionnaire 2 a list was compiled of the names and hospital numbers of the women who were still participating in the study. A list of the women who had attended Hospital A was given to the Medical Records Manager who then supplied the appropriate medical record. At Hospital B direct access had been granted to the computerised medical records of each participant.

Data from each of the questionnaires and the medical records were merged into one computer file and entered into a statistical package. The data was analysed first in terms of frequencies then using Chi-squared, unrelated T-tests and Pearsons Moment Correlation Coefficient. Finally multivariate analysis was performed to examine associations between

two or more variables. (A more detailed account of the methods used is provided in appendix 11)

4.2 The Health Professional Study

4.2.1 The Pilot Study

As the questionnaire was designed for use amongst different health professionals a pilot study was conducted with a small number of practice nurses (2), midwives (3) and physiotherapists (5). It was thought that practice nurses provide the least specialised care whilst physiotherapists provide the most specialised care for women with stress incontinence. If the questionnaire proved suitable for both of these professions it would, in theory, also be suitable for the other health professions.

A number of changes were made to the questionnaire following the pilot study. These were as follows. The set of responses representing the course of action taken for stress incontinence were divided into antenatal and postnatal. It was suggested that a different course of action would be adopted according to whether the woman was pregnant or had already delivered her baby. Space was provided on the questionnaire so that the point of referral could be added. The length of time taken to instruct women on pelvic floor exercises was divided into 2 response categories. These were 'one to one' or a 'group session'. It became apparent that whilst some health professionals provide instruction only on a one to one basis, others provide group training. Some health professionals provide instruction to both individuals and groups but suggested the time spent with each would differ.

An amended version of the questionnaire was created for completion by the physiotherapists. This was in order to collect information on the prophylactic care

provided to women during pregnancy and in the postpartum, and also to gather data on the treatment available to women with stress incontinence who had been referred for specialist treatment.

The final questionnaire is shown in the appendix 10.

4.2.2 The Main Study

Sample

The following numbers of questionnaires were given / sent out in total. This was split evenly between the two health authorities (with the exception of the physiotherapists, 2 went to staff at Hospital A and four to Hospital B).

Midwives -100

Health visitors - 100

Practice nurses - 60

Physiotherapists - 6

GP's - 100

Procedure

The study aimed to survey 50 members of each profession where possible. A 50% response rate was anticipated, therefore 50 professionals from each district were sent a questionnaire. Where any profession did not have 50 members of staff in the district as many staff as were employed were given a questionnaire to complete.

For each profession and within each district, a key member of staff (usually the manager) was identified. They were contacted for permission to survey their staff and also for

advice on the best means of doing this. As a result, the survey was administered in one of two ways. The names and addresses of all the GP's in the two districts were provided by key members of staff. The first 50 GP's on each list were sent a questionnaire by post. The mailing also contained a freepost envelope and an outline of the study.

The remaining questionnaires were handed out in person by the key member of staff in each profession and within each district. This method was chosen either because the member of staff responsible was reluctant to pass on names and addresses, or because they felt that the response would be greater if the questionnaire was administered by a member of their own staff, usually a manager. Questionnaires were provided, with envelopes and an outline of the study, to each of the key workers. In the case of the midwives, the total number of staff employed was far greater than 50. The questionnaires were therefore given out in such a way as to include both hospital and community staff, all grades and those working in a variety of settings, e.g. antenatal clinic, labour ward, and taking parentcraft or antenatal classes.

As the study did not have access to the names and addresses of the individual staff, with the exception of the GP's, it was not possible to send out personal reminders. Each of the key members of staff were therefore asked to remind their own staff to complete the questionnaire once the survey had begun.

4.3 The Interviews

4.3.1 The Main Study

Sample

Sample 1 consisted of forty two women, twenty six of whom were recruited from Hospital A and sixteen from Hospital B. This represented 23% of those with symptoms. Their ages ranged from twenty one to forty five with a mean of thirty one years. Two of the women were Asian, one was Black, the remainder were Caucasian. Fourteen of the women were para 1, eighteen were para 2, four were para 3 and one each were para 4, 5 and 7. (Information on three of the women was missing). The severity of the womens' condition ranged from 'less than one episode of incontinence per week' to 'daily incontinence'. (The representativeness of the sample in comparison to the symptomatic women is shown in table 4.3 below).

Table 4.3 A comparison Of Interviewees With The Sample Of Women Responding At 8

<u>Weeks Postpartum</u>		
	<u>Symptomatic Women</u>	<u>Women Interviewed</u>
	<u>At 8 Weeks Postpartum</u>	<u>At 8 Weeks Postpartum (sample 1)</u>
	N = 179	N = 42
<u>Age</u>		
Range	17 - 45	21 - 45
Mean	29.64	31.38
Std Deviation	5.16	5.43
<u>Parity</u>		
Range	1 - 7	1 - 7
Para 1	31%	33%
Para 1+	69%	67%
<u>Symptoms</u>		
Range	Occasionally - daily	Occasionally - daily
Mode	Occasionally	Occasionally

Sample 2 consisted of fifteen women, ten were recruited from Hospital A and five from Hospital B. This represented 21% of those reporting symptoms. Their ages ranged from twenty one to thirty four, the mean age being twenty eight. Two of the women were Asian, the remainder were Caucasian. Seven of the women were para 1, the remainder were para 2. The severity of their condition ranged from 'less than one episode per week' to 'daily incontinence' (See table 4.4).

<u>Symptomatic Women</u>		<u>Women Interviewed</u>
<u>At One Year Follow Up</u>		<u>At One Year Follow Up (sample 2)</u>
N = 69		N = 15
<u>Age</u>		
Range	17 - 45	21 - 34
Mean	29.74	28
Std Deviation	5.54	6.95
<u>Parity</u>		
Range	1 - 7	1 - 2
Para 1	37%	40%
Para 1+63%		60%
<u>Symptoms</u>		
Range	Occasionally - daily	Occasionally -daily
Mode	Occasionally	Occasionally

Five women took part in both interviews 1 and 2. Because the interviewer had been previously trained and had experience in conducting qualitative interviews, it was felt that further practice of interviewing by means of a pilot study was unnecessary. In addition, the interview was not designed to stick to a rigid format but would follow up questions where relevant and omit those which elicited a poor response. Therefore again a pilot study was felt to be irrelevant.

Procedure

Women reporting symptoms of stress incontinence on either questionnaires 2 and 3 were sent a letter within a week of the completed questionnaire being returned. The letter thanked each participant for completing the questionnaire and asked if she would like to take part in an interview. Details of why the interview was being undertaken, and what it involved were also provided. A reply slip and freepost envelope were included (with space

take part in an interview. Details of why the interview was being undertaken, and what it involved were also provided. A reply slip and freepost envelope were included (with space to include a telephone number) in order to facilitate response. Interview 1 was carried out at around 3 months postpartum. Interview 2 was carried out at around 13 months following delivery.

Women who indicated that they were willing to take part in an interview were contacted by telephone and an appointment made for a date and time convenient to them (N = 42 at eight weeks postpartum and 15 at one year following delivery). All interviews took place in the participants home. Women from both hospitals and with a range in severity of symptoms were interviewed.

The interview

The visit began with an introduction and a clarification of the aims of the research. Other preliminaries included informing each participant of the confidential nature of the study and describing briefly what the interview would entail. Permission was asked to take notes or tape record the interview. Although the initial intention had been to record all interviews some women did not wish to have the interview taped. In addition there were circumstances in which it was difficult to make a clear recording because of background noise eg. the television, other children, the baby crying. For these reasons taking notes became the preferred method of recording the data. Once the participant was ready to start, the interview commenced.

The interviews were recorded either by means of a cassette tape recorder, or by taking detailed notes in order to record the responses verbatim. As the interview was semi-

structured there were enough natural breaks to be able to record virtually all the conversation without disturbing the flow. This was also made possible by using shorthand. This form of recording had the advantage of being much quicker to transcribe on to the wordprocessor and became the preferred method of data collection, particularly as some women disliked, or refused to be recorded on tape.

The interview finished with a recap of the main points raised by the interviewee to ensure that a true representation of their views was understood and noted. Finally, participants were asked if there was anything else they wanted to add. Closure began by informing each participant of how the information was to be used in the future. Participants in interview 1 were also asked for permission to send the final questionnaire to them nine months later. The interview ended with each participant being thanked for their time and trouble.

Typing up of the scripts took place as soon after the interview as possible. This was to ensure that the information was still fresh in the memory, could be read and was understood in the context it was meant.

Organising The Data

The data was organised using the following steps. First, ideas on the theories and patterns began to form whilst the interviews were taking place and being transcribed. The transcripts were read through several times until the data became familiar. A list was then composed, comprising those issues, (topics, themes, patterns, language etc.) that appeared to be important, relevant or of particular interest to the research questions. The issues were each coded using a phrase which appeared to summarise the full meaning. Some of the data was listed under more than one heading.

Following this, each of the coded items were considered in turn. The transcripts were read over again in order to find any references made, or anything of relevance to that particular item. Anything found was highlighted onto a copy of the transcript and then copied onto a word-processing file along with all the other relevant sections of text for that item.

Whilst searching the transcripts for the relevant sections of text, new items emerged that appeared to be of importance. These items were thus coded and added to the list. The process began over again.

As a final check, copies of the highlighted transcripts were scrutinised again to see if there were any sections which had not been highlighted. If so, each section was studied in order to assess whether the information was relevant to the research. If so, it was added to the list as a new item.

Analysis And Interpretation

Each file containing the data pertinent to one of the coded items was read through on several occasions. From this, an impression of the overall content was obtained. The narratives were then explored in more depth by searching for descriptions, recurring themes and patterns, contrasts, negative and deviant cases etc. Some of these emerged naturally from the data, others were sought in response to specific questions or ideas. Another important step in the analysis involved consideration of the way the information was imparted. Phenomena such as the language, direct statements, inferred responses, evasiveness and avoidance etc. were looked at. This helped to provide an understanding

of what issues were important to the women themselves. Detailed notes were made and significant quotes highlighted.

The next stage in the analysis involved stepping away from looking at the individual items in isolation. Instead the items were considered in relation to each other. This involved exploring relationships or connections, disagreements, conflicts or contradictions. Also, building up evidence to provide a wider, more detailed picture of specific aspects of the phenomena. Again, detailed notes were made and informative quotes selected.

The following step involved returning to the individual transcripts to consider the data as individual cases rather than looking at items across case. This was useful to obtain an overall history for each of the individual women. Contradictions and repetitions became evident at this stage.

Provisional hypotheses were put forward to try and explain the different relationships which occurred. In order to verify these, alternative explanations were sought as well and the data checked for plausibility. If they appeared not to be plausible they were rejected and new interpretations sought.

Using all of the different notes a structure began to emerge of how the contents could be constructed into a wider framework. Once the framework was established, the notes were written up in detail to provide a full description of the contents of the interviews. Quotes were added to provide illustration and to verify or validate the interpretation made. As an ongoing process the transcripts were checked to ensure the analysis provided the most accurate and full interpretation.

Chapter 5

Results

The Prevalence Of Stress Incontinence And Associated Factors

As already stated, the aims and objectives of the study were as follows:

1. To measure the prevalence of stress incontinence during pregnancy and following delivery.
2. To investigate the role of possible risk factors for the condition.
3. To examine what services are available to women with stress incontinence
4. To look at the role of pelvic floor exercises in preventing and treating the condition.
5. To look at the instruction provided to women and assess how effective it is.
6. To examine the physical and psychological effects of incontinence on the sufferer.

The following section presents the results from questionnaires 1, 2, and 3 in conjunction with data from the medical records in order to meet aims 1 and 2 above.

5.1 Questionnaire 1 - 36 Weeks During Pregnancy

Questionnaire 1 was sent at thirty six weeks pregnancy to the 918 women who agreed to take part in the survey provided that their pregnancy was progressing. Seven hundred and seventeen women returned the questionnaire giving a response rate of 78%

Table 5.1 The Prevalence Of Stress Incontinence

	No.	%
Yes	419	58.4
No	261	36.4
No but had in past	37	5.1
Total	717	99.7

Four hundred and nineteen women (58.4%) reported stress incontinence at thirty six weeks of pregnancy. Two hundred and sixty one (36.4%) reported having no symptoms whilst a further thirty seven (5.1%) reported that whilst they currently had no symptoms they had had them in the past.

Table 5.2 When Symptoms Began

	No.	%
During this pregnancy	275	60.3
A previous pregnancy	142	31.1
Before ever pregnant	27	5.9
Missing information	12	2.6
Total	456	99.9

For the majority of women, two hundred and seventy five in total (60.3%) the symptoms began during pregnancy. One hundred and forty two women (31.1%) reported that they had started during a previous pregnancy and twenty seven women (5.9%) stated that they had begun prior to any pregnancy.

Table 5.3 Frequency Of Symptoms

	No.	%	% of total sample
< once per week	140	33.4	19.6
One per week	66	15.7	9.3
Several times per week	136	32.4	19.1
Daily	72	17.1	10.1
Missing information	5	1.1	0.7
Total	419	99.7	58.8

Of the symptomatic women, two hundred and six (49.1%) reported that their symptoms were infrequent. One hundred and thirty six (32.4%) had leakage several times per week, whilst seventy two women (17.1%) reported daily leakage.

Table 5.4 Use of Sanitary Protection

	No.	%	% of total sample
Never	242	57.7	33.9
Occasionally	117	27.9	16.4
Always when exercising	9	2.1	1.3
Most / everyday	46	10.9	6.5
Missing information	5	1.1	0.7
Total	419	99.7	58.8

Many of the symptomatic women, two hundred and forty two (57.7%) in total never used sanitary protection. One hundred and seventeen (27.9) used it occasionally. Nine women (2.1%) always needed protection during exercise whilst forty six (10.9%) needed it everyday.

Table 5.5 The Need To Change Underwear

	No.	%	% of total sample
Never	115	27.4	16.1
Occasionally	253	60.3	35.5
Always following exercise	10	2.3	1.4
Most / everyday	38	9.0	5.3
Missing information	3	0.7	0.4
Total	419	99.7	58.7

One hundred and fifteen (27.4%) symptomatic women never needed to change their underwear because of leakage. Two hundred and fifty three (60.3%) did occasionally. Ten women (2.3%) always changed their underwear following exercise and thirty eight (9.0%) did everyday.

5.2 Questionnaire 2 - Eight Weeks Postpartum

Questionnaire 2 was sent at eight weeks postpartum to the 894 women who delivered a live health baby. Five hundred and seventy two questionnaires were returned giving a response rate of 64%.

Table 5.6 The Prevalence Of Stress Incontinence

	No.	%
Yes	179	31.4
No	206	36
No but have in past	187	32.6
Total	572	100

Nearly one third of all women, one hundred and seventy nine in total reported symptoms of stress incontinence at eight weeks postpartum. Two hundred and six women (36%) reported no symptoms ever, whilst one hundred and eighty seven women (32.6%) reported non current symptoms

A statistically significant association was found between stress incontinence during pregnancy and following delivery (Chi. Sq. = 59.6, $p = 0.000$, d.f. = 1). Women who had stress incontinence during pregnancy were also likely to report symptoms following delivery.

Table 5.7 When Symptoms Began

	No.	%	% of total sample
Before any pregnancy	12	6.7	2
Previous pregnancy	76	42.2	10
During this pregnancy	45	25	7.8
Since giving birth	46	25.6	8
Total	179	99.5	27.8

Just twelve of the symptomatic women reported that it began prior to any pregnancy. Seventy six women (42.2%) stated that it began in connection with a previous pregnancy. Forty five women (25%) reported their symptoms began during the current pregnancy and forty six women (25.6%) reported their symptoms began since giving birth this time.

Table 5.8 Frequency Of Symptoms

	No.	%	% of total sample
Occasionally	128	71.1	22.3
Once a week	8	4.4	1.4
Several times per week	29	16.1	5.1

Daily	14	7.7	2.4
Total	179	99.3	31.2

Whilst the majority of women reported their symptoms occurred occasionally or once per week, twenty nine women (16.1%) stated that their symptoms occurred several times per week. For fourteen women (7.7%) leakage occurred on a daily basis.

Table 5.9 Use Of Sanitary Protection

	No.	%	% of total sample
Never	107	59.4	18.7
Occasionally	52	28.8	9.1
When exercising	7	3.8	1.2
Most / everyday	13	7.2	2.3
Total	179	99.2	31.2

Few women needed sanitary protection. One hundred and seven (59.4%) women never needed it whilst fifty two (28.8%) used it occasionally. Seven women (3.8%) used it whilst exercising. For some thirteen women (7.2%) protection was needed everyday.

Table 5.10 The Need To Change Underwear

	No.	%	% total sample
Never	49	27.2	8.6
Occasionally	115	64.2	20.1
Following exercise	3	1.6	0.5
Most / everyday	12	6.6	2.1
Total	179	99.6	31.1

Similarly, forty nine women (27.2%) never needed to change their underwear whilst one hundred and fifteen (64.2%) only did this on occasion. Three women (1.6%) always changed their underwear following exercise and for twelve women (6.6%) this was an everyday occurrence.

A measure of the reliability of the study was undertaken by comparing the answers provided on questionnaire 2 with those from questionnaire 1 in relation to when the symptoms began. Of the 180 women who reported symptoms of stress incontinence at eight weeks following delivery, 72% gave answers corresponding to those on questionnaire 1. (Information was missing in 4% of cases). The biggest proportion who gave different answers (27/49) reported that incontinence had first started since giving birth although previously had reported that symptoms started during pregnancy. This indicates that caution is needed in relation to the response stating that stress incontinence first started since giving birth.

5.3 Questionnaire 3 - One year Following Delivery

Questionnaire 3 was sent at one year following delivery to the 180 women who reported symptoms of stress incontinence at eight weeks postpartum. One hundred and six questionnaires were returned giving a response rate of 58%.

Table 5.11 The Prevalence Of Stress Incontinence

	No.	%
Yes	69	65.1
No	37	34.9
Total	106	100

Of the women who were incontinent following delivery 65.1% still had symptoms at one year follow up. For thirty seven women 34.9% the symptoms had ceased.

Table 5.12 When Symptoms Ceased

	No.	%
Six weeks	8	21.6
Three months	16	43.2
Three - six months	6	16.2
Six months +	3	8.1
missing information	4	10.8
Total	37	99.9

For those women whose symptoms ceased this occurred at different times. Just eight women (21.6%) reported that their symptoms ceased at around six weeks or so. For sixteen women (43.2%) they ceased within three months of delivery. Six women (16.2%) reported they stopped between three and six months postpartum whilst a further three (8.1%) reported this occurred later than six months.

Table 5.13 Occurrence Of Symptoms

	No.	%
less than once per week	28	40.6
once per week	10	14.5
several times per week	20	29.0
daily	3	4.3
missing information	8	11.6

For those women who still reported symptoms twenty eight (40.6%) reported just occasional leakage and ten women (14.5%) less than once per week. A total of twenty women (29%) had leakage several times per week whilst three (4.3%) had daily leakage.

Table 5.14 Use Of Sanitary Protection

	No.	%
No	38	55
Occasionally	21	30.4
always when exercising	5	7.2
most / everyday	5	7.2
Total	69	99.8

Thirty eight (55%) of the symptomatic women did not need to use sanitary protection and twenty one (30.4%) did just on occasion. Five women (7.2%) in each case always used protection when exercising or everyday.

Table 5.15 The Need To Change Underwear

	No.	%
No	19	27.5
occasionally	45	65.2
always when exercising	2	2.9
most / everyday	3	4.3
Total	69	99.9

Again, few women felt the need to change their underwear. Nineteen (27.5%) never did whilst forty five (65.2%) only did on occasion. Just two women (2.9%) changed their underwear following exercise whilst three (4.3%) did everyday.

Table 5.16 Medical Advice For The Condition

	No.	%
Yes	12	11.3
No	93	87.7
missing information	1	0.9

Few women sought help for their condition. Just twelve (11.3%) of the one hundred and six women had done so in the year following delivery.

There was no relationship between the severity of the condition and whether or not the women sought help.

Who They Sought Help From

The twelve women each sought or received medical attention from different health professionals. One woman received help from a hospital midwife, two women each from a community midwife and health visitor. Three women received attention from their GP, another from a physiotherapist.

What Help They Received

Ten of these women received information on pelvic floor exercises, in the other two cases the information was missing. Five women received information regarding stopping the flow of urine midstream, and another on vaginal cones. Just one woman received additional information. This was not identified in the questionnaire. Three of the women were referred on to another health professional. These were a GP and a consultant. The third was not specified.

5.4 Medical Records Information

5.4.1 Variables Not Associated With Stress Incontinence

Additional information was taken from the medical records of the women who returned questionnaire 2. The following variables were not found to be significantly associated with stress incontinence:

- exercise prior to pregnancy (Chi Sq. = 0.776, $p = 0.942$, d.f. = 4). (This information was obtained via questionnaire 1).
- smoking habits (Chi Sq. = 2.31, $p = 0.511$ d.f. = 3)
- induction of labour. (Whilst a relationship was found to occur between the induction of labour and the prevalence of stress incontinence following delivery (Chi Sq. = 6.909, $p = 0.032$, d.f. = 2) this was not evident following removal from the sample of the women who had a caesarean section (Chi Sq. = 0.126, $p = 0.722$ d.f. = 1).
- augmentation of labour (Chi Sq. = 0.514, $p = 0.474$, d.f. = 1)
- length of second stage of labour ($p = 0.095$, d.f. = 448, $t\text{-test} = -1.67$).
- perineal damage (Chi Sq. = 6.52, $p = 0.164$, d.f. = 4).
- number of babies delivered (Chi Sq. = 2.307, $p = 0.129$, d.f. = 1). (However, as the sample of women who had had two babies was small i.e. 5, it is possible that the lack of association resulted from this).
- type of feeding on discharge. (Chi Sq. = 0.649, $p = 0.723$, d.f. = 2)

(See appendix xii for details of the frequency of these variables)

5.4.2 Variables Showing a Trend With Stress Incontinence

Two other variables did not reach statistical significance but did show a trend. These were:

a) age b) length of first stage of labour.

Age

The Sample

The age of the women ranged from sixteen to forty five. The mean age was 28.9 years and the standard deviation 5.44. (n = 527, information was missing in 46 cases)

The Association With Stress Incontinence

The 162 women who had stress incontinence tended to be older than the 356 without (29.6 years compared to 28.6 years, $p = 0.056$ d.f. = 516, t- value = 1.91). Information was missing in 54 cases. The difference may have occurred due to the influence of parity. Women of higher parity were significantly older ($p = 0.00$, t - test = -7.20 d.f. = 525). The mean age of women who were para 1 was 27.05 compared to 30.34 of women para 2 or more.

Length Of First Stage Of Labour

The Sample

According to the medical records the length of the first stage ranged from 5 minutes to 1360. The mean was 370 minutes and standard deviation 226. (n = 460) (Women who had had a caesarean section were omitted from these figures).

The Association With Stress Incontinence

Whilst a difference was found between length of first stage and stress incontinence following delivery, it did not quite reach statistical significance ($p = .052$, t - value -1.95 d.f.

= 450). However, the 156 women who had stress incontinence appeared to have a shorter length of labour (mean 343.5 minutes) compared to the 296 women without symptoms (mean 387.3 minutes). Information was missing in 120 cases.

5.4.3 Variables Associated With Stress Incontinence

The following variables were found to be significantly associated with stress incontinence:

- ethnicity
- parity
- pain relief
- method of delivery
- total length of labour
- blood loss
- birthweight
- head circumference.

These are discussed in detail below.

Ethnicity

Table 5.17 Ethnicity Of The Sample

	No.	%	Stress incontinent	Not incontinent
White	515	89.8	165	340
Black	9	1.5	1	8
Asian	17	2.9	1	16
missing = 31			missing = 41	

Association With Stress Incontinence

A statistically significant relationship was found to occur between ethnicity and the prevalence of stress incontinence following delivery. The relationship indicated that Caucasian women were more likely to report stress incontinence compared to Black or Asian women (Chi Sq. = 7.232, $p = 0.0269$ d.f. = 1). It is possible however that the significant relationship found between postpartum stress incontinence and ethnicity was due to a bias in the sample of women who chose to return the questionnaire. There may have been some reluctance in non Caucasian women to return the questionnaire if they were stress incontinent. (Unfortunately, information on the ethnicity of the sample at the time of consent, or when questionnaire 1 was administered, was not available).

Association With Other Variables

Ethnicity was found to be associated with three additional variables. These were: a) parity b) head circumference c) weight. For these relationships the sample was divided into white or non white women.

a) A relationship was found to occur between ethnicity and parity ($p = 0.000$ d.f. = 16). A higher proportion of Black or Asian women were of high order parity compared to Caucasian women. This relationship cannot however explain the association which occurred between ethnicity and stress incontinence as Black or Asian women were found to have a lower incidence of stress incontinence compared to Caucasian women, yet a higher parity was associated with a higher incidence of stress incontinence. However, when comparing ethnicity with just two categories of parity i.e. para one or para two and higher, the relationship was not statistically significant ($p = 0.385$ d.f. = 2).

b) A difference was found between head circumference and ethnicity. This reached statistical significance ($p < 0.001$, t -value = 3.51, d.f. = 509). Non Caucasian women (25

in total) delivered babies with, on average, a smaller head circumference compared to the 486 Caucasian women. (33.78 compared to 34.76 cm respectively).

c) The difference between ethnicity and birthweight was also found to be statistically significant ($p > 0.001$, t -value 3.61, d.f. = 532). The average birthweight of babies born to the 26 noncaucasian women was lower than those born to the 508 Caucasian women for whom information was available. Their respective weights were 3073g and 3431g.

Parity

The number of births each woman had had.

Table 5.18 Parity Of The Sample

	No.	%	Stress incontinent	Not incontinent
One	243	42.4	56	183
Two	182	31.7	65	115
Three	88	15.3	34	51
Four	26	4.5	9	17
Five	7	1.2	3	4
Six	2	0.3	0	2
Seven	4	0.6	4	0
Eight	1	0.1	0	1
Ten	2	0.3	0	1
missing = 17			missing = 27	

The Association With Stress Incontinence

A statistically significant relationship was found to occur between parity and incontinence following delivery (Chi Sq. = 22.95, $p = 0.003$, d.f. = 8). Women of para 1 were less likely to report stress incontinence compared to women of higher order parities. A further comparison made between women of para 1 with women of para 2 or higher,

showed the association to be of greater statistical significance (Chi Sq. = 11.817, $p = 0.001$, d.f. = 1). However, whilst parity was found to be strongly associated with the development of stress incontinence, this was not evident when the women of parity 1 were removed from the sample (Chi Sq. = 9.61, $p = 0.212$, d.f. = 7). This would suggest that the likelihood of stress incontinence increases with the second, but not necessarily subsequent, births.

The Association With Other Variables

Parity was found to be significantly associated with a number of other variables. These were: a) age b) method of delivery c) ethnicity d) blood loss e) length of first stage of labour f) total length of labour

a) A comparison between women who were para one with those para two or higher in relation to age showed the difference to be statistically significant ($p = 0.001$, $t\text{-value} = 17.20$, d.f. = 525). The 230 women who were para one were on average, younger than the 297 women of higher parity, 27.05 years compared to 30.34 years respectively.

b) Parity was found to be significantly associated with the method of delivery (Chi Sq. = 54.31, $p = 0.001$, d.f. = 16). Information was available on 547 women.

Table 5.19 Parity and Method of Delivery

Method	Parity						
	one	two	three	four	five	six	seven
Spontaneous	151	135	72	16	7	2	4
Instrumental	40	37	11	10	0	0	0
Caesarean	48	7	3	0	0	0	0

	eight	nine	ten
Spontaneous	1	0	2
Instrumental	0	0	0
Caesarean	0	0	0

- The relationship was also significant when comparing the women of para one with women para two or higher (Chi Sq. =40.59, $p = 0.001$, d.f. = 2). The association showed that women of para one were less likely to have a spontaneous delivery and more likely to have an instrumental or caesarean delivery compared to women of para two or higher.
- c) As already stated, ethnicity was significantly associated with parity (Chi Sq. = 81.60, $p = 0.001$, d.f. = 16).

Table 5.20 Ethnicity and Parity

	Ethnicity		
	Caucasian	Black	Asian
Parity			
One	231	2	7
Two	167	2	6
Three	81	3	3
Four	25	0	1
Five	6	0	0
Six	2	0	0
Seven	2	0	0
Eight	0	1	0
Ten	1	0	0

Information was available on 541 women. Caucasian women were more likely to be of higher order parity compared to Non Caucasian women yet the relationship was not significant when parity was split into para one or para two or higher.

- d) The difference between blood loss and parity one or parity two reached statistical significance ($p = 0.001$, $t\text{-value} = 4.10$, $d.f. = 534$). The 233 women of para one lost on average, a greater amount of blood during their delivery compared to the 303 women of parity two or higher. (325.6 ml compared to 252.3 ml) Information was missing in 36 cases). It is likely this relationship occurred due to the influence of method of delivery.
- e) The difference between parity and length of first stage of labour was found to be statistically significant ($p = 0.001$, $t\text{-value} = 8.58$, $d.f. = 459$). The 207 women of para one had on average, a longer first stage of labour compared to the 254 women of para two or higher. (464.03 minutes compared to 294.9 minutes). Information was missing in 111 cases.

- f) The above difference was also evident when the total length of labour was used ($p = 0.001$, $t\text{-value} = 9.05$, $d.f. = 458$). The 206 women of parity 1 had on average a total length of labour of 533.6 minutes compared to 325.87 minutes for the 254 women of parity two plus. Information was missing in 112 cases.

Pain Relief

Table 5.21 Types Of Pain Relief Used By The Sample

	Yes	%	No	%	Missing	%
Entonox	368	64.2	168	29.3	37	6.4
Pethidine	249	43.4	287	50.0	37	6.4
Epidural	116	20.2	420	73.2	37	6.4
General anaesthetic	32	5.5	504	87.9	37	6.4
Spinal analgesia	39	6.8	497	86.7	37	6.4

Each method of pain relief tends to be associated with a particular type of delivery, for example entonox is usually used with a vaginal delivery whilst a general anaesthetic is used in cases of caesarean section. A spinal analgesia is used entirely for those women having an elective caesarean section. It is possible that in many cases the women had more than one type of pain relief, particularly when the anticipated method of delivery was altered. For the purpose of the study each method used was noted for the individual woman but the analysis did not take into consideration any combinations of pain relief used.

The Association With Stress Incontinence

Two forms of pain relief were found to be significantly associated with the development of stress incontinence following delivery. These were inhalation (Chi Sq. = 4.661, $p = 0.031$, $d.f. = 1$) and spinal analgesia (Chi Sq. = 6.81, $p = 0.009$, $d.f. = 1$). Women who inhaled entonox were more likely to report stress incontinence compared to women who did not

use this form of pain relief. In contrast, women who had a spinal analgesic were less likely to report stress incontinence following delivery compared to women who had not.

Two other methods showed a trend with the development of stress incontinence although neither reached statistical significance. These were: a) epidural and b) general anaesthetic. Women who had had an epidural were less likely to report stress incontinence compared to women who did not (Chi Sq. = 3.486, $p = 0.062$, d.f. = 1). Women who had had a general anaesthetic were less likely to report stress incontinence compared to those who did not (Chi Sq. = 3.606, $p = 0.576$, d.f. = 1).

The Association With Other Variables - Entonox

Table 5.25 Inhalation and Stress incontinence

	No	%	Stress incontinent	Not incontinent
Yes	363	68.9	125	238
No	164	31.1	41	123
Missing = 45			Missing= 45	

The use of entonox during labour was significantly associated with the following variables:

a) age b) method of delivery c) spinal analgesia d) blood loss e) birthweight

- a) The difference between use of entonox and age at delivery reached statistical significance ($p = 0.011$, $t\text{-value} = -2.54$, d.f. = 508). The 349 women who had used entonox appeared to be on average, younger than the 161 women who had not. (28.4 years compared to 29.7 years respectively). Information was missing in 62 cases.
- b) A significant relationship was found between inhalation and the method of delivery (Chi Sq. = 96.92, $p = 0.000$, d.f. = 2). Women who had had a spontaneous or

instrumental delivery were more likely to use entonox for pain relief, but less likely to use it if they had had a caesarean section.

Table 5.23 Inhalation and Method of delivery

	Inhalation	
	Yes	No
Method		
Spontaneous	296	85
Instrumental	22	68
Caesarean	43	15

Missing = 43

The relationship found between inhalation and postpartum stress incontinence may have reflected the type of birth they had, as this has been found to be associated with the development of stress incontinence. A spontaneous or instrumental delivery is associated with a higher incidence of stress incontinence compared to a caesarean section.

- c) An association also occurred between the use of entonox and that of spinal analgesia (Chi Sq. = 66.66, $p = 0.001$, d.f. = 1). The relationship was negative i.e., women who used entonox were unlikely to have had a spinal anaesthetic.

Table 5.24 Inhalation and Spinal analgesia

	Inhalation	
	Yes	No
Spinal		
Yes	4	35
No	364	133

Information was missing in 75 cases.

- d) The difference between blood loss and the use or not, of entonox reached statistical significance ($p = 0.001$, $t\text{-value} = -383$ d.f. = 516). The 358 women who had used entonox lost a smaller amount of blood on average (261.1ml), in comparison with the 160 women who had not used it (336.7ml).
- e) The difference between birthweight and the use of not of entonox reached significance at $p = 0.001$ ($t\text{-value} = 3.37$, d.f. = 527). The 362 women who had used entonox gave birth, on average, to heavier babies (3465.6 g) compared to the 167 women who had not used this means of pain relief (3307.8g). (In addition, whilst women who used entonox appeared to give birth to babies with a larger head circumference the relationship did not reach statistical significance ($p = 0.091$, $t\text{-value} = 1.69$, d.f. = 506).

Table 5.25 Association With Other Variables - Spinal anaesthesia

	No	%	Stress incontinent	Not incontinent
Yes	39	7.4	5	34
No	488	92.6	161	327
missing = 45			missing = 45	

Spinal analgesia was associated with four other variables. These were: a) method of delivery b) use of entonox c) blood loss d) birthweight. However spinal analgesia was commonly used as a means of pain relief in caesarean sections. As the length of labour was not noted for women having a caesarean section, spinal analgesia was not considered in relation to length of labour.

- a) A significant relationship was found to occur between the use of spinal anaesthesia and the method of delivery (Chi Sq. = 174.95, $p = 0.000$, d.f. = 2).

Table 5.26 Spinal analgesia and method of delivery

Method	Spinal	
	Yes	No
Spontaneous	1	380
Caesarean	36	54
Instrumental	1	56

Missing = 44.

Spinal anaesthesia was not used as a method of pain relief in spontaneous or instrumental births but was used in connection with some caesarean sections. The significant relationship found between spinal analgesia and stress incontinence may therefore result from the association between method of delivery and stress incontinence, as a caesarean section was found to be associated with a lower incidence of postpartum stress incontinence.

- b) As already stated, the association between the use of spinal analgesia with the use of entonox reached statistical significance at $p = 0.000$ (Chi Sq. = 66.66 d.f. = 1). Few women who had had a spinal analgesia also used entonox as another form of pain relief.
- c) The difference loss of blood and use or not of spinal anaesthesia reached statistical significance at $p = 0.001$ (t-value = 3.46, d.f. = 516). The 34 women who had had a spinal analgesia lost, on average, a greater amount of blood (403.82ml) compared to the 484 women who had not had a spinal analgesia (276.13ml). Information was missing in 54 cases.

- d) The difference between birthweight and use or not of spinal anaesthesia was significant at $p = 0.006$ (t -value = -2.74, d.f. = 527). The 39 women who had a spinal analgesic gave birth on average to babies of a lower birthweight (3203.82g) compared to the 490 women who did not have a spinal analgesic (3432.65g). Information was missing in 43 cases.

Method Of Delivery

Table 5.27 Method of Delivery

	No.	%	Stress incontinent	Not incontinent
Normal	392	68.4	134	251
Forceps	31	5.4	9	22
Ventouse	28	4.8	11	16
Emergency caesarean	52	9.0	9	42
Planned caesarean	46	8.0	7	39
Missing information	24	4.1	missing = 32	

Twelve (2.9%) women had a failed ventouse delivery.

The Association With Stress Incontinence

A statistically significant relationship was found between the method of delivery and the prevalence of stress incontinence (Chi Sq. = 13.297, $p = 0.009$, d.f. = 4). The association became stronger when the different methods were merged into three categories - spontaneous, caesarean (including emergency and elective) and instrumental (including forceps and ventouse) (Chi Sq. = 12.314, $p = 0.002$, d.f. = 2). However, the relationship appeared to result from the apparent protective effect of a caesarean section. Women

who had had a normal or an instrumental delivery were more likely to report stress incontinence compared to those who had had a caesarean section.

No difference was found in the prevalence of stress incontinence between those women who had had an emergency caesarean section compared to those who had had an elective caesarean (Chi Sq. = 0.002, $p = 0.748$, d.f. = 1).

No difference was found between a normal delivery or an instrumental one with regard to the prevalence of stress incontinence (Chi Sq. = 0.002, $p = 0.962$, d.f. = 1). A comparison of forceps and ventouse delivery did not show any difference with regard to the prevalence of stress incontinence (Chi Sq. = 0.876, $p = 0.349$, d.f. = 1)

Association With Other Variables

It was not possible to investigate the relationship between length of first stage of labour or total length of labour and method of delivery using caesarean section due to information not having been collected on the length of labour for women who had had a caesarean section. In addition, the relationship between spinal anaesthetic and method of delivery was not examined as women who had a spinal anaesthetic had usually had a caesarean section.

Method of delivery was significantly associated with a) parity, b) entonox c) blood loss d) weight of the baby, also e) length of first stage of labour (spontaneous versus instrumental delivery only f) total length of labour (spontaneous versus instrumental delivery only).

- a) As stated, the association between method of delivery and parity was significant (Chi Sq. = 54.31, $p = 0.000$, d.f. = 16), it also reached significance when parity was split

into just two categories, i.e. para one and para two or higher (Chi Sq. = 40.59, $p = 0.000$, d.f. = 2). The relationship showed that women of parity one were less likely to have had a spontaneous delivery or a caesarean section but more likely to have had an instrumental delivery in comparison to women of higher parity.

- b) As stated, women who had had a spontaneous or instrumental delivery were more likely to have used entonox as a form of pain relief in comparison to women who had had a caesarean section. The association between the two variables was significant (Chi Sq. 96.92, $p = 0.000$, d.f. = 2).
- c) As stated, women who had had a caesarean section lost, on average a greater amount of blood during delivery compared to women who had had a spontaneous or instrumental delivery. The difference between the two variables was statistically significant ($p = 0.001$, t-value = -10.20, d.f. = 527)
- d) As stated women who had had a spontaneous or instrumental delivery gave birth, on average, to heavier babies in comparison to women who had had a caesarean section. The difference between the two groups reached statistical significance ($p = 0.000$, t-value = -10.20, d.f. = 527).
- e) Comparing spontaneous or instrumental delivery in relation to the length of first stage of labour showed statistical significance of $p = 0.000$ (t-value = -5.64, d.f. = 445). The length of labour associated with a spontaneous delivery was on average much shorter than that associated with an instrumental delivery. The 389 women who had a spontaneous delivery had a mean first stage of labour of 342.44 minutes compared to 514.72 minutes for the 58 women who had had a caesarean delivery.
- f) Similarly, a significant difference was found between total length of labour and method of delivery ($p = 0.000$, t-value = -6.43, d.f. = 75.10). The total length associated with a spontaneous delivery was on average much shorter than that of an

instrumental delivery (382 minutes compared to 611 minutes). 388 women had a spontaneous delivery whilst 58 women had a caesarean section.

Total Length Of Labour

The Sample

The total length of labour ranged from 7 to 1015 minutes. The mean total length was 413 minutes, standard deviation 247 minutes. (n = 459).

The Association With Stress Incontinence

The difference between total length of labour and the presence or absence of stress incontinence following delivery reached statistical significance ($p = .032$, t - value -2.15 , $d.f. = 448$). The mean total length of labour was shorter for the 156 women who reported symptoms (380.1 minutes) compared to the 294 who did not (432.8 minutes). Information was missing in 122 cases.

The Association With Other Variables

Similar to the length of the first stage of labour it was not possible to examine the relationship with method of delivery or use of spinal anaesthetic.

The total length of labour was significantly associated with a) parity and b) the length of first stage of labour.

- a) As stated, women of parity one appeared on average to have had a longer total length of labour in comparison to women of parity two or higher. The difference was statistically significant ($p = .001$, t -value = 9.05 , $d.f. = 458$).
- b) A strong positive correlation was found to occur between the total length of labour and the length of the first stage ($r=0.908$). The correlation was statistically significant ($p > 0.001$).

Blood Loss

The Sample

Blood loss ranged from 50ml to 1600ml. The mean was 284.2 ml and standard deviation 208.39. (N = 536)

The Association With Stress Incontinence

A difference was evident between the amount of blood lost at delivery and the presence or absence of postpartum stress incontinence. The 165 women with stress incontinence lost less blood on average, compared to the 362 without symptoms ($p = 0.029$, t -value -2.19 , $d.f. = 525$). Information was missing in 45 cases. The average loss for those women with symptoms was 255.7 ml compared to 298.7 ml for those without symptoms.

The Association With Other Variables

Blood loss was associated with the following variables: a) method of delivery b) parity c) entonox d) spinal anaesthesia.

- a) As stated, comparison of the amount of blood lost during a caesarean section with that of a spontaneous delivery showed a significant relationship. Women who had had a caesarean section lost a greater amount of blood compared to those having a spontaneous delivery ($p = 0.000$, T - value = -8.31 , $d.f. = 105.41$). Similarly, comparison of the amount of blood lost during a caesarean section with that of an instrumental delivery was significant at $p = 0.001$, t - value = -3.64 , $d.f. = 63.75$.
- b) As stated, a difference was evident between blood loss and parity ($p > 0.001$, t -value = 4.10 , $d.f. = 534$). Women of parity one lost on average, a greater amount of blood compared to women of parity two or higher.

- c) As stated, the difference between blood loss and use or not of entonox was significant at $p > 0.001$ (t-value = -3.83 d.f. = 516). Women who had used entonox tended to lose less blood during delivery in comparison to women who had not used this method of pain relief.
- d) As stated, women who had had a spinal anaesthetic appeared to lose more blood in comparison to women who had not. The difference between the two groups reached statistical significance ($p = 0.001$, t-value = 3.46, d.f. = 516).

Further analysis undertaken using the sample of women having had a vaginal or non instrumental delivery found a significant association with parity. (It was not relevant to also consider the association with spinal anaesthesia as only women having had a caesarean section had a spinal anaesthesia). Women of parity 1 lost more blood on average in comparison to women of parity 2+ (290 ml compared to 212 ml). The difference was statistically significant (t-value = 4.75, $p = 0.000$, d.f. = 428).

When the sample only included women who had had a caesarean section both entonox and parity were not found to show any significant difference in relation to blood loss. However, women who had had a spinal anaesthetic had a mean loss of blood greater than those who had not (406 ml and 528 ml respectively). The difference was statistically significant (t-value = -203, $p = 0.046$, d.f. = 81).

Birthweight

The Sample

The weight of the babies ranged from 1522g to 5188g. The mean weight was 3413.7g and standard deviation 508.52. ($n = 549$)

The Association With Stress Incontinence

The difference between birthweight and the presence or absence of stress incontinence was found to be statistically significant ($p = .007$, t -value 2.72, $d.f. = 539$). The mean weight of babies born to the 170 women with stress incontinence was greater than that of babies born to the 371 women who were asymptomatic, i.e. 3502.4g compared to 3374.5g. Information was missing in 31 cases.

The Association With Other Variables

Weight was found to be associated with the following variables: a) ethnicity b) method of delivery c) use of entonox d) use of spinal anaesthetic e) head circumference

- a) As stated, a difference was found between the weight of the baby and the ethnicity of the mother ($p = 0.000$, t -value = 3.61, $d.f. = 532$). Caucasian women gave birth, on average to heavier babies in comparison to non Caucasian women.
- b) As stated, birthweight and method of delivery showed a difference that reached statistical significance ($p = 0.000$, t -value = 3.59, $d.f. = 540$). Women having had a non-caesarean birth were more likely to have delivered a heavier baby in comparison to women who had had a caesarean section.
- c) As stated, the difference between the weight of the baby and the use or not of entonox showed that women who had had entonox were more likely to give birth to heavier babies in comparison to women who had not used entonox. The difference reached statistical significance ($p = 0.001$, t -value = 3.37, $d.f. = 527$).
- d) As stated, women who had had a spinal anaesthetic were associated with having given birth to lower birthweight babies in comparison to women who had not had a spinal anaesthetic. The difference was statistically significant ($p = 0.006$, t -value = -2.74, $d.f. = 527$).

- e) The relationship between birthweight and head circumference showed a moderate correlation ($r = 0.722$). This was statistically significant ($p = 0.000$).

Headcircumference

The Sample

The head circumference of the babies in the sample ranged from 30.cm to 39.cm. The mean was 34.71 and standard deviation 1.39. ($n = 526$)

The Association With Stress Incontinence

The difference found between head circumference and the prevalence of stress incontinence was statistically significant. ($p = 0.031$, t -value = 2.17, d.f. = 516). The head circumference of babies born to the 160 women with symptoms was, on average, greater than that born to the 358 asymptomatic women (34.9 compared to 34.6cm). Information was missing in 54 cases.

The Association With Other Variables

Two variables were found to be associated with the head circumference of the baby. These were a) ethnicity and b) weight.

- a) As stated, the difference between ethnicity and head circumference was significant at $p = 0.000$ (t -value = 3.51, d.f. = 509). Caucasian women appeared to have given birth to babies who had a larger head circumference in comparison to non-Caucasian women.
- b) As stated, a moderate, positive relationship was found to occur between the size of head circumference and the weight of the baby at birth ($r = 0.722$). This relationship was statistically significant ($p = 0.000$).

None of the above variables were significantly associated with stress incontinence at one year follow up. However, this may have been due to the study only following up those women who were incontinent at eight weeks postpartum.

5.5 Multivariate Analysis

Multivariate analyses were performed using those variables which were univariately associated with stress incontinence. However, although not significant, age showed a trend to be positively associated with stress incontinence. Other research findings have reported such a significant association. For this reason it was also included in the multivariate analysis. Two variables were excluded from the analysis. These were ethnicity and total length of labour. Ethnicity was excluded as it was thought that the data may have been biased, with non Caucasian women not reporting stress incontinence. In addition numbers in this category were few (this is discussed in Chapter 9). Total length of labour was also excluded as no data had been collected on the women who had had a caesarean section. It was thought that this factor would heavily influence the results. However, a logistic regression analysis was also undertaken separately for women who had had a spontaneous or instrumental delivery.

The following variables were considered in the analysis:

age

parity

method of delivery

blood loss

birthweight.

5.5.1 Discriminant Function Analysis

A stepwise model was used and the groups classified according to group membership. The classification of the discriminant function analysis showed that 68.4% of the cases were correctly classified using this procedure. However, most of the correct classification resulted from women without stress incontinence being classified as such, i.e. true negatives = 96.1%. Women who had symptoms of stress incontinence were also classified as not having the condition i.e., false negatives = 90.5%. Just 16 women with stress incontinence were classified as such, i.e. true positives = 9.5%, whilst 14 women without stress incontinence were classified as having it, i.e. false positives = 3.9%. The overall percentage correctly classified was relatively high due to the high proportion of women in the survey who did not have stress incontinence. The results showed that the presence (or absence) of stress incontinence cannot be predicted with any great accuracy by these variables.

The eigenvalue measures how well the function performs, a low value indicates poor performance. In the present case this was 0.053 indicating poor predictiveness.

The canoconical correlation was 0.24 indicating poor association between the discriminant scores and the groups. The canoconical discriminant functions of the group means showed that on average, those women with stress incontinence had a slightly higher discriminant score than those who did not have symptoms. However, the difference between them was negligible, i.e. 0.35 and -0.17 respectively. For all individual variables, the difference between the mean of the two groups was minimal, showing that they were not easily discriminated between. For each of the variables, Wilks' Lambda was high ranging between 0.99 (blood loss) and 0.98 (parity) prior to entry. A lambda of 1 occurs when the observed group means are equal, and 0 where there is total variability. For the

three variables remaining in the function, again Wilks' lambda remained high, i.e. 0.99 (parity) to 0.94 (method of delivery).

The final classification included only three of the variables. These were parity, method of delivery and birthweight. Blood loss and age were removed from the equation. It would appear that the association these have with stress incontinence was mainly due to a third variable. The pooled within groups correlation showed that the strongest association between any of the variables was that of blood loss and method (0.4). A high blood loss was associated with caesarean section. Vaginal and instrumental deliveries were associated with a lower loss of blood. The next strongest correlation occurred between age and parity (0.29). As the parity of a woman increased so did her age. Blood loss and parity also showed some measure of association (0.17). Women of parity one tended to lose more blood than women of a higher parity.

The largest standardised canonical discriminant function coefficient was that of parity (0.66), parity therefore exerted the most influence in the relationship between all of the variables. This was followed by weight (0.62) then method of delivery (0.49).

To summarise, symptoms of stress incontinence could not easily be predicted from factors which were univariately associated with the condition. The univariate associations may have been significant largely because of the high numbers of women involved in the survey. The literature showed much disagreement about risk factors for stress incontinence and there may be many different causes and contributory factors. It would appear from this that whilst a number of factors were associated with the condition, they did not necessarily lead to the symptoms occurring in individual women.

5.5.2 Logistic Regression

Model 1

The following variables were entered into the first model. Method and parity were entered on block one using the entry method. Age, blood loss and birthweight were entered in block two using forward conditional method. Five hundred and seventy three cases were selected. Eighty two were rejected because of missing data. The analysis was therefore undertaken on four hundred and ninety one women.

This model predicted sixty eight percent of cases correctly. However, as with the discriminant function analysis, the model correctly predicted the true negatives as such but failed to predict the true positives. As the former represented the largest sample this accounted for the relatively high percentage predicted correctly.

Three hundred and twenty eight women out of three hundred and thirty seven without stress incontinence, were correctly predicted i.e. 97%. In contrast only six women out of one hundred and fifty four with stress incontinence, were predicted correctly i.e. 4%.

Additional statistics confirmed the poor predictability of the model. The loglikelihood is a measure of how well the model fits the data. If the model fits perfectly $2LL = 0$. In the present model $2LL = 582.5$ which indicated very poor predictability. Similarly, there was a high value, i.e. 488.3, for the goodness of fit statistic which compares the observed probabilities to those predicted by the model. Examination of the histogram showed little variation between the two groups thereby indicating that different criteria to assign cases would not be beneficial to the model.

Similar to the discriminant function analysis, two of the variables, age and blood loss were not included in the final model. The variables remaining in the model were therefore parity ($p = -0.0004$), method of delivery ($p = 0.007$) and birthweight (0.01). Parity showed the greatest partial correlation to the dependent variable, although the value was low, i.e. $r = -0.13$. Partial correlation for method was $r = 0.09$ and birthweight $r = -0.08$.

With respect to the relationship between the variables, method and weight showed the highest correlation, although this was low, i.e. -0.09 . The correlation between method and parity was -0.05 and between parity and weight $= 0.008$.

Model 2

Analysis was undertaken on the sample of women who had had either a spontaneous or instrumental delivery. Four hundred and forty two cases were selected. Thirty eight were rejected because of missing data, four hundred and four were therefore analysed. As the cases were selected using method of delivery this variable was not included in the analysis. The following variables were included; parity, age, blood loss, birthweight and total length of labour.

A total of 64% of cases were correctly predicted. Again the model predicted the true negatives, i.e. 254/265 (95%) but was a poor predictor of the true positives, i.e. 7/139 cases (5%). The overall poor predictability of the model was confirmed by high values for 2LL and the goodness of fit statistic, i.e. 504.5 and 402.8 respectively.

The variables included in the final model were parity ($p = .003$) and weight. Again, age and blood loss, and also total length of labour, were not included in the final model.

Similar to the previous model, parity had the highest partial correlation to the dependent variable, although the value was low ($r = 0.114$). Partial correlation for weight was 0.012. Correlation between the two variables in the final model was low = -0.012.

Model 3

The analysis was undertaken on the sample of women who had had a caesarean section. Ninety seven cases were selected. Of these, thirteen women were rejected and the analysis was undertaken on the remaining eighty four cases.

The model predicted 85% of cases. Whilst all of the true negatives were correctly predicted, none of the true positives were. The latter accounts for 18% of the total sample hence the high percentage correctly classified in the final model. The model, using only the constant was not able to classify any women as having stress incontinence. No variables were included in the model (although parity nearly reached statistical significance ($p = 0.07$)). To summarise, parity, age, weight or blood loss were not predictors of all stress incontinence in women who had had a caesarean section.

5.5.3 Odds Ratio

The odds ratio were calculated for the following variables; method of delivery, parity and birthweight.

<u>Table 5.28</u> <u>Vaginal/instrumental</u>	<u>Stress Incontinence</u>	
	Yes	No
Yes	154	289
No	16	81

The odds ratio for having a vaginal or instrumental birth compared to a caesarean section was 2.7

<u>Table 5.29</u>	<u>Stress Incontinence</u>	
<u>Parity 2+</u>	Yes	No
Yes	111	187
No	56	183

The odds ratio for women of para two or more compared to women of para one was 1.9

<u>Table 5.30</u>	<u>Stress Incontinence</u>	
<u>Birthweight > 3500</u>	Yes	No
Yes	88	145
No	82	223

The odds ratio for women giving birth to a baby weighing 3500g or more (the mean weight of the sample) was 1.65

The results show that whilst stress incontinence cannot easily be predicted by these factors, all three, particularly having a vaginal or instrumental birth, greatly increase the likelihood of having stress incontinence.

5.6 Summary

Stress incontinence affected 59% of women during pregnancy. For the majority, the condition first began during this pregnancy, whilst others had symptoms prior to this. Six percent reported that their symptoms began before ever becoming pregnant. Nearly one third of all women had symptoms which occurred at least several times per week or on a daily basis. The prevalence following delivery was 31%. Seven percent reported that their symptoms occurred several times per week or on a daily basis. One quarter of all symptomatic women reported that their symptoms first began following delivery.

Of those women who reported symptoms at 8 weeks postpartum, 65% were still symptomatic at one year follow up. In the majority of cases where the symptoms had stopped by one year, this had occurred within the first three months of delivery. Just 11% of those with symptoms at one year had sought help for the condition. Those that had, sought or received it from a variety of health professionals; hospital midwives, community midwives, health visitors, GP's and physiotherapists. The help usually consisted of information on pelvic floor exercises, although three women were referred on to another health professional for more specialist treatment.

The following variables were found to be associated with stress incontinence;

- ethnicity
- parity
- types of pain relief, i.e. entonox and spinal anaesthesia
- method of delivery
- total length of labour
- blood loss

- birthweight .
- head circumference

Some of these associations probably occurred due to the presence of confounding variables. Discriminant function analysis and logistic regression showed that predictions could not easily be made as to whether an individual developed stress incontinence. Parity, method of delivery and birthweight appeared to be associated with development of the condition. However, age, and blood loss appeared to be associated with the development of stress incontinence mainly by virtue of their relationship to other variables, i.e. age was related to parity, whilst blood loss was associated to the method of delivery.

Although parity and weight contributed to the development of stress incontinence in women who had had a spontaneous or instrumental delivery, this was not the case for women who had had a caesarean section. Using multivariate analysis, there was no good predictor of stress incontinence.

Chapter 6

Results

Pelvic Floor Exercises

The following chapter presents the results from questionnaire 1, 2 and 3 in relation to pelvic floor exercises, in conjunction with data from the medical records. This is in order to meet, in part, aims 3-5 (listed on page 123).

The questions were designed to elicit information on whether the women had received information on pelvic floor exercises, who from, how it was provided and whether they did pelvic floor exercises. This would provide detail on the quality of instruction the women received and how they responded to the information provided. In addition, the above information would be considered in relation to the outcome of stress incontinence. This would enable conclusions to be drawn regarding the effectiveness of pelvic floor exercises in preventing or treating the condition.

6.1 Questionnaire 1 - Thirty Six Weeks Of Pregnancy

Questionnaire 1 was sent out at thirty six weeks of pregnancy to the 918 women who consented to take part in the study, providing that their pregnancy was still progressing.

Seven hundred and seventeen questionnaires were returned giving a response rate of 78%.

Table 6.1 Receiving Information On Pelvic Floor Exercises

	No.	%
Yes	397	55.3
No	320	44.6
Total	717	100

By thirty six weeks of pregnancy around half of the women, three hundred and ninety seven in total (55.3%) had received information on pelvic floor exercises from a health professional. The remaining three hundred and twenty had not.

Table 6.2 Who Provided The Information

	No.	%
Hospital midwife	110	15.4
Community midwife	202	28.3
GP	11	1.5
Practise nurse	27	3.8
Physiotherapist	87	12.2

Most of the information came from the community midwife, two hundred and two women had received it via this source, or the hospital midwife. A physiotherapist had provided information to eighty seven women whilst a GP and practise nurse had provided it to eleven and twenty seven women respectively. In some cases the women received it from more than one source.

Table 6.3 How The Instruction Was Provided

	<u>Method of instruction</u>		<u>Sole method of instruction</u>	
	No.	%	No	%
Mention / reminder	111	15.6	53	7.4
Leaflet	214	30.0	118	16.5
Verbal instruction	167	23.4	46	6.4
Physical instruction	111	15.6	30	4.2

The most common way of providing the information was by leaflet (two hundred and fourteen women). One hundred and sixty seven women received the information via verbal instruction whilst one hundred and eleven women each received the information via physical instruction and via a mention or a reminder. For many women, one hundred and eighteen in total a leaflet was the only means by which they received information whilst a further fifty three only received the information via a brief mention or reminder.

Table 6.4 The Number Of Women Who Performed Pelvic Floor Exercises

	No.	%
Yes	494	68.9
No	217	30.2
Missing	6	0.6
Total	717	99.7

A large proportion of the women, four hundred and ninety four, performed pelvic floor exercises.

Table 6.5 When The Exercises Were Begun

	No.	%
Prior to this pregnancy	181	25.4

1 - 3 months	65	9.1
4 - 6 months	125	17.5
7 months	111	15.6
Not applicable	219	30.7
Missing information	16	2.2
Total	717	100.5

The women began to exercise at varying points of pregnancy. One hundred and eighty one began prior to this pregnancy, sixty five at between one and three months, one hundred and twenty five at between four and six months and one hundred and eleven at seven months or later.

Table 6.6 The Relationship Between Antenatal Pelvic Floor Exercises And Stress Incontinence

<u>Frequency</u>	<u>Continent</u>		<u>Stress Incontinent</u>	
	No.	%	No.	%
None	124	17.2	95	13.2
Occasionally	108	15	61	8.5
Once per week	26	3.6	10	1.3
Several times per week	82	11.4	72	11.2
Daily	70	9.7	52	7.2
Missing information - 17 (2.3%)				

This table shows that there is little difference in the proportions of continent and incontinent women with respect to the frequency of exercise.

6.1.1 The Relationship Between Receiving Information And Practising The Exercises

Women who received information on pelvic floor exercises from health professionals at this time were more likely to practise them. The relationship reached statistical

significance ($\chi^2 = 86.243$, $p = 0.000$, $d.f. = 1$). However, sixty three women (15.9%) who received information did not do them, whilst one hundred and sixty three women who did not receive information at this time did practise the exercises during their pregnancy.

6.2 Questionnaire 2 - Eight Weeks Postpartum

Questionnaire 2 was sent out at eight weeks postpartum to 894 women who had delivered a live and healthy baby. Five hundred and seventy two questionnaires were returned giving a response rate of 64%.

Table 6.7 Receiving Information On Pelvic Floor Exercises

	No.	%
Yes	490	85.6
No	80	13.9
Missing Information	2	0.3
Total	572	99.8

The majority of women, four hundred and ninety, received information on pelvic floor exercises following delivery. However, eighty received non information at this time.

Table 6.8 Who Provided The Information

	No.	%
Hospital midwife	319	55.7
Community midwife	230	40.1
Health visitor	110	19.2
GP	40	7.0
Practice nurse	22	3.8
Physiotherapist	89	15.5

The midwives were the most likely health professional to provide information to the women at this time. Three hundred and nineteen women received information from a hospital midwife and two hundred and thirteen from a community midwife. One hundred and ten women received information from a health visitor, eighty nine from a physiotherapist, forty from a GP and twenty two from a practice nurse.

Table 6.9 Method Of Instruction

	<u>Method of Instruction</u>		<u>Sole Method of Instruction</u>	
	No.	%	No.	%
Mention / reminder	203	35.4	53	9.2
Leaflet	394	68.8	184	32.1
Verbal instruction	144	25.1	17	2.9
Physical information	48	8.4	5	0.8

Similar to during pregnancy the most popular way of providing information was via a leaflet. This occurred in three hundred and ninety four cases. Two hundred and three women received information via a brief mention or reminder, one hundred verbally and forty eight as a physical reminder.

Again, a large proportion of women only received the information via one method, usually a leaflet.

The Information Received During Pregnancy And Following Delivery

Two hundred and ninety four women (51.3%) received information both during their pregnancy and also following delivery. In contrast, thirty one women (5%) were not given any information on pelvic floor exercises during these times.

Table 6.10 The Number Of Women Who Performed Pelvic Floor Exercises

	No.	%
Yes	471	82.2
No	101	17.8
Total	572	100

Whilst the majority of women, four hundred and seventy one, (82.2%) performed pelvic floor exercise following delivery, one hundred and one (17.8%) did not.

6.2.1 The Relationship Between Receiving Information And Performing The Exercises

As expected, a significant relationship was found to occur between receiving information on pelvic floor exercises following delivery and performing them (Chi Sq. = 28.23, $p = 0.000$ d.f. = 1). Nevertheless, seventy (14.2%) women who received information did not practise the exercises. In contrast, forty nine women who did not receive any information in the postpartum period exercised their pelvic floor at that time (48%).

Table 6.11 When The Exercises Were Begun

	No.	%
Prior to this pregnancy	116	20.2
During this pregnancy	210	36.7
Since giving birth	130	22.7
Missing information	16	2.8
Total	472	99.9

The women began exercising at various points. One hundred and sixteen began prior to this pregnancy, two hundred and ten during the pregnancy, and one hundred and seventy since giving birth.

Table 6.12 The Relationship Between Postpartum Exercises And Stress Incontinence

<u>Frequency</u>	<u>Stress Incontinent</u>		<u>Continent</u>	
	No.	%	No.	%
None	26	4.5	76	13.2
Occasionally	59	10.2	113	19.7
Once per week	8	1.3	22	3.8
Several times per week	50	8.7	91	15.8
Daily	35	6.1	78	13.6

Missing information - 14 (2.4%)

This table shows that a higher proportion of women were continent with respect to each category of exercise frequency. A higher proportion of continent women exercised irregularly compared to regularly. This was also true for women who were stress incontinent.

Table 6.13 Number Of Daily Sessions

	No.	%
One / two	72	12.6
Three / four	21	3.7
> four	19	3.3
Missing information	1	0.1
Total	113	19.7

6.3 Questionnaire 3 - One Year Postpartum

Questionnaire 3 was sent at one year following delivery to the 180 women who reported symptoms of stress incontinence at eight weeks postpartum. One hundred and six questionnaires were returned, giving a response rate of 58%.

Table 6.14 The Number Of Women Who Performed Pelvic Floor Exercises

	No.	%
Yes	47	44.3
No, but have done them in past	50	47.2
no	9	8.5
Total	106	100

By one year following delivery few of the women had never performed pelvic floor exercises. Forty seven (44.3%) still did them whilst fifty (47.2%) did not perform them now but had done so in the past.

Table 6.15 When The Pelvic Floor Exercises Were Stopped

	No.	%
Before last pregnancy	3	6
since last pregnancy	42	84

missing information	5	10
Total	50	100

Of the women who had stopped exercising most, forty two in total, had stopped since the pregnancy whilst three had ceased prior to this pregnancy.

Table 6.16 When Those That Exercised Until Giving Birth Finally Stopped.

	No.	%
six weeks	17	40.4
three months	21	50
six months	3	7.1
missing information	1	2.4
Total	42	99.9

Most women who exercised until giving birth stopped within six week or three months, seventeen and twenty one women respectively. Just three stopped at six months postpartum.

6.4 The Relationship Between Pelvic Floor Exercises And Stress

Incontinence (see appendix for raw data)

6.4.1 Antenatal Pelvic Floor Exercises And Stress Incontinence During Pregnancy

No relationship was found to occur between pelvic floor exercises, performed antenatally, and stress incontinence at this time, although the number of sessions per day did show a

trend. (Using a 1 tailed test this relationship reached statistical significance $p = 0.03$). The variables were:

- a) whether pelvic floor exercises were performed or not (Chi Sq. = 0.66, $p = 0.382$ d.f. = 1),
- b) the frequency of pelvic floor exercises (Chi Sq. = 6.960, $p = 0.148$, d.f. = 4)
- c) when they were first started (Chi Sq. = 6.530, $p = 0.163$, d.f. = 4)
- d) the number of times per day a session of exercises were performed (Chi Sq. = 8.726, $p = 0.068$, d.f. = 4).

6.4.2 Antenatal Pelvic Floor Exercises And Postpartum Stress Incontinence

The variables relating to antenatal pelvic floor exercises were considered in relation to the prevalence of postpartum stress incontinence following delivery. These were:

- a) whether the exercises were performed (Chi Sq. = 1.399, $p = 0.237$, d.f. = 1)
- b) when they were started (Chi Sq. = 2.578, $p = 0.631$, d.f. = 4)
- c) how often they were performed (Chi Sq. = 14.516, $p = 0.006$, d.f. = 1)
- d) the number of sessions per day (Chi Sq. = 7.533, $p = 0.11$, d.f. = 4). Using a one tailed test this showed a trend.

Just one of these, 'how often they were performed', was found to be significantly related to the prevalence of stress incontinence. The relationship showed that women who performed pelvic floor exercises several times per week or daily, were less likely to have postpartum stress incontinence compared to those women who did them occasionally or just once per week. However, women who did not perform any exercises were also less likely to report postpartum stress incontinence. (Of those who did not exercise during pregnancy 56% reported symptoms of stress incontinence whilst 44% did not).

As a result of this finding, a further comparison was made between the women who did exercises and those who did not, in order to find out whether there were any differences between the two samples of women. The results showed that they were found to vary in relation to the following variables:

- a) Age at delivery.

The mean age of women who performed pelvic floor exercises was 29.4 years compared to 27.4 years for those women who did not. This reached significance at $p = <0.000$, (t -test = 3.87, d.f. = 3).

- b) Ethnicity.

A higher proportion of Caucasian women performed the exercises compared to Black and Asian women (Chi Sq. = 6.715, $p = 0.035$, d.f. = 2).

- c) Smoking habits.

Women who performed the exercises were less likely to smoke compared with those who did not (Chi Sq. = 19.025, $p = 0.003$, d.f. = 3).

- d) Exercise prior to pregnancy.

Women who did pelvic floor exercises were also more likely to undertake other forms of exercise on a regular basis compared to those who did not. (Chi Sq. = 15.031, $p = 0.005$, d.f. = 4).

- e) Method of feeding at discharge.

Women who performed pelvic floor exercises were more likely to breast feed their baby compared to those who did not (Chi Sq. = 15.931, $p = 0.000$, d.f. = 2).

- f) Use of entonox or spinal analgesia.

Women who performed pelvic floor exercises were more likely to have inhaled entonox to provide pain relief (Chi Sq. = 5.132, $p = 0.023$, d.f. = 1) but less likely to have had a spinal anaesthetic (Chi Sq. = 10.672, $p = 0.001$, d.f. = 1) compared to women who did not exercise.

- h) Weight of the baby.

Women who practised pelvic floor exercises gave birth, on average, to a heavier baby than women who did not perform them ($p = 0.047$, $t\text{-test} = -1.99$, $d.f. = 540$)

- i) Onset of labour.

Women who performed pelvic floor exercises were more likely to have had an induced labour compared to women who did not perform pelvic floor exercises ($\text{Chi Sq.} = 4.844$, $p = 0.028$ $d.f. = 1$).

Table 6.17 Differences Between The Women Who Performed Pelvic Floor Exercises And Those Who Did Not

<u>Exercisers</u>	<u>Non-Exercisers</u>
Mean age - 29.4 years	Mean age - 27.4 years
$t\text{-test} = 3.87$, $p = <0.00$, $d.f. = 3$	
higher proportion of Caucasian	higher proportion of non Caucasian
$\text{Chi Sq.} = 6.715$, $p = 0.35$, $d.f. = 2$	
more likely to perform general exercise	less likely to perform exercise
$\text{Chi Sq.} = 15.031$, $p = 0.005$, $d.f. = 4$	
more likely to breast feed	less likely to breastfeed
$\text{Chi Sq.} = 15.931$, $p = <0.00$, $d.f. = 2$	
entonox	spinal anaesthetic
$\text{Chi Sq.} = 10.672$, $p = 0.001$, $d.f. = 1$	
heavier baby	lighter baby
$p = 0.047$, $t\text{-test} = -1.99$, $d.f. = 540$	
induced labour	spontaneous labour
$\text{Chi Sq.} = 4.844$, $p = 0.02$, $d.f. = 1$	

6.4.3 Postpartum Pelvic Floor Exercises And Postpartum Stress Incontinence

No significant relationship was found to occur between any of the variables relating to pelvic floor exercises performed postnatally and the prevalence of postpartum stress incontinence. The following variables were considered:

- a) whether pelvic floor exercises were performed or not (Chi Sq. = 2.021, $p = 0.155$, d.f. = 1)
- b) how often they were practised (Chi Sq. = 3.632, $p = 0.458$, d.f. = 4)
- c) when the exercises were first started (Chi Sq. = 7.535, $p = 0.057$, d.f. = 3)
- d) the number of times per day a session of exercises were undertaken (Chi Sq. = 2.416, $p = 0.491$, d.f. = 3).

However, there appeared to a trend between when the exercises began and the prevalence of postpartum stress incontinence, a further statistic was therefore performed. A comparison was made between those women who began pelvic floor exercises during pregnancy and those who began since giving birth. This was found to be statistically significant (Chi Sq. = 4.549, $p = 0.033$ d.f. = 1). The relationship showed that women who began pelvic floor exercises during their pregnancy were less likely to report postpartum stress incontinence compared to women who began the exercises after they gave birth.

This relationship also remained significant when women who did not perform pelvic floor exercises were included in the sample (Chi Sq. = 6.409, $p = 0.041$, d.f. = 2). However, those women who had not done any pelvic floor exercises were also less likely to report stress incontinence.

6.4.4 Antenatal Pelvic Floor Exercises And Long Term Stress Incontinence

No relationship was found to occur between the following:

- a) practising pelvic floor exercises antenatally (Chi Sq. = 0.624, $p = 0.43$, d.f. = 1)
- b) how often they were done (Chi Sq. = 1.662, $p = 0.798$, d.f. = 4).

6.4.5 Postpartum Pelvic Floor Exercises And Long Term Stress Incontinence

The relationship between performing pelvic floor exercises following delivery, and stress incontinence at one year postpartum, reached statistical significance (Chi Sq. = 6.257, $p = 0.012$, d.f. = 1). Women with stress incontinence at this time were more likely to have performed pelvic floor exercises in the early postpartum. No relationship was evident with regard to the following variables however:

- a) how often they performed them at this time (Chi Sq. = 3.779, $p = 0.437$, d.f. = 4)
- b) the number of times per day they were practised (Chi Sq. = 1.327, $p = 0.515$, d.f. = 2).

6.4.6 Pelvic Floor Exercises At One Year Follow Up And Long Term Stress Incontinence

The association between performing pelvic floor exercises at one year postpartum and stress incontinence did not quite reach statistical significance (Chi Sq. = 3.788, $p = 0.052$, d.f. = 1). The trend showed however, that women who performed pelvic floor exercises at this time were more likely to have stress incontinence compared to women who did not exercise. It is presumed that the women continued to exercise as a consequence of their condition. This suggests that once incontinence is established pelvic floor exercises are not very effective, although it is possible they were not performed correctly. No relationship was evident with regard to:

- a) how often they were performed (Chi Sq. = 3.78, $p = 0.437$, d.f. = 4)
- b) the number of times per day they were carried out (Chi Sq. = 1.327, $p = 0.515$, d.f. = 2).

6.6 Summary

Findings from the survey revealed that the instruction in pelvic floor exercises was inconsistent in terms of provision, method and source. Consequently, some women received very detailed information which was sometimes replicated, whilst others received none at all. Although the majority of women practised pelvic floor exercises, for many this was on an occasional basis only. At each point in time (i.e. thirty six weeks of pregnancy, eight weeks postpartum and one year following delivery), less than half of the sample performed pelvic floor exercises regularly if at all, (i.e. 58.8%, 52.7% >55.7% respectively) . It was therefore concluded that many women were not practising pelvic floor exercises regularly enough to obtain any real beneficial effect.

Consideration of the efficacy of pelvic floor exercises in treating or preventing stress incontinence revealed associations over two points in time. A significant relationship was apparent between performing exercises at one year follow up and the prevalence of long term symptoms, i.e. women who did exercises at one year postpartum were more likely to have stress incontinence. However it is likely that the exercises were performed as a consequence of the condition, rather than the other way around. A relationship was also apparent between pelvic floor exercises performed antenatally and stress incontinence at eight weeks postpartum i.e. women who began pelvic floor exercises during pregnancy were less likely to report postpartum stress incontinence compared to women who began exercising following delivery. Also, women who performed pelvic floor exercises several times per week, or daily, were less likely to report stress incontinence in the postpartum compared to those who did them less regularly. However, women who did not exercise

their pelvic floor were also less likely to report stress incontinence in comparison to those who did them irregularly. As a result of this unexpected finding, further analysis was undertaken. This showed differences between women who exercised and those who did not, in relation to a number of variables. These included age and ethnicity, also health behaviours such as general exercise, smoking habits and method of feeding their baby and obstetric variables, i.e. use of analgesia, onset of labour and the weight of the baby.

Chapter 7

Results

The Health Professional Study

The following chapter presents the findings from the survey of health professionals. The survey was undertaken in order to help meet aims 3 and 5 (see page 122) which look at the service provision, in particular the instruction in pelvic floor exercises given to women.

7.1 Response

7.1.1 Response Rate

The response rate to the survey was disappointingly low. A total of three hundred and sixty six questionnaires were sent out. Of these, one hundred and twenty six were returned completed giving a response rate of 34%. For each of the individual professions the response rates were as follows:

Midwives - 38 (38%),

Health visitors - 30 (30%),

GP's - 37 (37%),

Practice nurses - 17 (28%)

Physiotherapists - 4 (66%).

The practice nurses were requested to return the questionnaire unanswered if they felt that the survey was not relevant to their sphere of practice. Fourteen questionnaires were thus returned. Had these returned questionnaires been taken into account, the total response rate for the survey would be 38% and for the practice nurses, 52%.

It is possible that the response rate would have been higher if reminders had been issued to all health professionals. Unfortunately, this was not possible as the names and addresses of individual staff had not been supplied, except in the case of the GP's (see procedure).

7.1.2 Survey Participants

The greatest number of health professionals taking part in the survey were midwives and GP's. For the purpose of analysis the midwives were divided into two groups: hospital based midwives and community midwives. The smallest number was the physiotherapists, reflecting the small number of obstetric physiotherapists based within the districts.

Table 7.1 Participants In The Survey

	No. (% of sample)
Hospital midwife	25 (19.8)
Community midwife	13 (10.3)
Health visitor	30 (23.8)
GP	37 (29.4)
Practice nurse	17 (13.5)
physiotherapist	4 (3.2)

7.2 The Care For Women During Pregnancy

7.2.1 Discovering Symptoms Of Stress Incontinence (Table 7.2)

One quarter of all health professionals (27%) reported that they routinely asked women whether they had symptoms of stress incontinence when the women came within their care. Over half (53.2%) of the sample reported that they asked women about their symptoms occasionally. The remainder (19.8%) did not check whether the women had any symptoms. This pattern varied to some extent between the different health

any symptoms. This pattern varied to some extent between the different health professions. Community midwives were the most likely to ask women routinely about symptoms (30.8%), whilst hospital based midwives were the least likely (23.1%). Just one community midwife (7.7%) reported that she /he never enquired about symptoms whilst 32.4% of the GP's did not make enquiries.

Table 7.2 Checking For Symptoms Of Stress Incontinence

	Yes	Sometimes	Never
	No. (%)	No. (%)	No. (%)
Hospital midwife	5 (20)	14 (56)	6 (24)
Community midwife	4 (30.8)	8 (61.5)	1 (7.7)
Health visitor	7 (23.3)	19 (63.3)	4 (13.3)
GP	10 (27)	15 (40.5)	12 (32.4)
Practice nurse	4 (23.4)	11 (64.7)	2 (11.8)
Physiotherapist	4(100)	- -	- -

7.2.2 The Course Of Action Taken During The Antenatal Period

The questionnaire asked what course of action was taken by the health profession on finding out that a woman was suffering from stress incontinence. The most common course of action was to provide information on pelvic floor exercises.

Table 7.3 The Course Of Action Taken During The Antenatal Period

	No. (%)
Referral to another health professional	35 (42.7)
Inform / advise on:	
anatomy of the pelvic floor	39 (47.6)
causes of the condition	48 (58.5)
general exercises	27 (33)
pelvic floor exercises	56 (68.3)
Provide detailed instruction / treatment on:	
pelvic floor exercises	37 (45.1)

7.2.3 Referral Patterns (Table 7.4)

Thirty five (42.7%) reported that they referred on to another health professional (this may not always be the first course of action) and fourteen provided information on the health professionals they would refer to. There appeared to be no discernible pattern of referral, and no individual profession was identified as the most appropriate point of referral.

Table 7.4 Referral Patterns						
<u>Referral</u> <u>from</u>	<u>Referral To</u>					
	A	B	C	D	E	F
Hospital midwife				2		1
Community midwife		1	1			1
Health visitor	1	1	1			
GP	1	1		1	1	
Practice nurse		1				
Key A - Hospital midwife B - Community midwife C - GP D - Physiotherapist E - Consultant F - Continence Clinic						

7.3 Care For Women Following Delivery

7.3.1 The Course Of Action (Table 7.5)

Eighty two health professionals provided care for women during the early or late postnatal period. A higher proportion took action for symptoms of stress incontinence during the postpartum period compared with during the antenatal period. Again, the most popular course of action was to provide information on pelvic floor exercises.

Table 7.5 The Course Of Action Taken During The Postnatal Period

	No. (%)
Referral to another health professional	51 (62.2)
Inform / advise on:	
anatomy of the pelvic floor	52 (63.4)
causes of the condition	52 (63.4)
general exercises	40 (48.8)
pelvic floor exercises	69 (84.1)
Provide detailed instruction / treatment on:	
pelvic floor exercises	55 (67.1)

7.3.3 Referral Patterns (Table 7.6)

Of the fifty one who referred a woman with symptoms to another health professional, thirty four provided details. Similar to the referrals during the antenatal period the patterns of referral in the postpartum period varied. The exception to this was the hospital midwives, all of whom referred to a physiotherapist.

Table 7.6 Referral Patterns

<u>Referral</u> <u>from</u>	<u>Referral To</u>					
	A	B	C	D	E	F
Hospital midwife				5		
Community midwife			1	1		1
Health visitor		1	4	2	1	3
GP	2			2	1	1
Practice Nurse	1	3		1		1
Key - A - Hospital midwife B - Community midwife C - GP D - Physiotherapist E - Consultant F - Continence clinic						

7.4 Satisfaction / Improvements In Care

7.4.1 Satisfaction With The Course Of Action (Table 7.7)

A total of seventy (55.6%) of the health professionals were satisfied with the course of action they were able to offer to women with symptoms of stress incontinence. Fifty three (42.1%) were not satisfied. (The questionnaire did not specify the reasons for any dissatisfaction).

Table 7.7 Satisfaction With The Course Of Action

	Yes	No	Missing
	No. (%)	No. (%)	No. (%)
Hospital midwife	12 (48)	13 (52)	- -
Community midwife	7 (54)	5 (38)	1 (7.6)
Health visitor	17 (57)	13 (43)	- -
GP	24 (65)	13 (35)	- -
Practice nurse	7 (41)	8 (47)	2 (12)
Physiotherapist	3 (75)	1 (25)	- -

7.4.2 Improvements In The Course Of Action (Table 7.8)

The majority (89.7%) felt that practice could be improved in some way. Again there were slight differences between the proportions of staff feeling that improvements were necessary.

Table 7.8 Improvements In The Course Of Action

	Yes	No	Missing
	No. (%)	No. (%)	No. (%)
Hospital midwife	24 (96)	1 (4)	- -
Community midwife	11 (84.6)	1 (7.7)	1 (7.7)
Health visitor	29 (96.7)	1 (3.3)	- -
GP	31 (83.8)	5 (13.5)	1 (2.7)
Practice nurse	14 (82.4)	2 (11.8)	1 (5.9)
Physiotherapist	4(100)	- -	- -

Details of the improvements which could be made in the services according to the different professions are shown in table 7.9.

Table 7.9 Ways Of Improving The Care For Women With Stress Incontinence

	Hospital midwife No. %	Community midwife No. %	Health visitor No. %	GP No. %	Practice nurse No. %	Physio- therapist No. %	Total No. %
More time to spend with women	21 (80.8)	5 (38.5)	5 (29.4)	9 (24.3)	9 (30)	3 (75)	52 (41.2)
Increased knowledge regarding sources of referral	16 (61.5)	6 (46.2)	11 (64.7)	14 (37.8)	19 (63.3)	1...(25)	67 (53.1)
More information / training given to yourself	22 (84.6)	7 (53.8)	10 (58.8)	11 (29.7)	24 (80)	1 (25)	75 (59.5)
More informative material to give out to women	23 (88.5)	6 (46.2)	12 (70.6)	22 (59.5)	26 (86.7)	2...(50)	91 (72.2)
More / better equipment to use in treating the condition	9 (34.6)	2 (15.4)	2 (15.4)	5 (13.5)	4 (13.3)	2 (50)	(19.0)

Table 7.10 Ways Of Improving The Instruction On Pelvic Floor Exercises

	Hospital midwife No. %	Community midwife No. %	Health visitor No. %	GP No. %	Practice nurse No. %	Physio therapist No. %	Total No. %
More time to spend with women	16 (72.7)	1 (11.1)	11...(47.8)	11 (68.7)	5...(35.7)	2...(5)	46 (52.2)
More information / training given to yourself	18...(81.8)	8 (88.8)	21 (91.3)	9 (56.2)	8 (57.1)	1...(25)	65 (73.8)
More informative material to give out to women	17 (77.2)	9 (100)	21 (91.3)	12...(75)	10 (71.4)	0 -	69 (78.4)

7.4.3 Additional Suggestions For Improvements

The questionnaire also provided the opportunity for participants to suggest other improvements they felt were necessary in the provision of care for stress incontinent women. The replies given related to: 1) education, 2) referral 3) physiotherapy, 4) English as a second language and 5) other.

1) Two suggestions were aimed at making the service provision more consistent across and within the different health professions:

- Provide more education for staff so there is a consistency in the information given.
(clinical specialist)
- Clearly designed protocols and consistent multidisciplinary approach in relation to GP's, Continence Advisor etc. (Health visitor x 2)

2) A number of suggestions were made to improve the system of referral. These were:

- Easier referral system. (Practice nurse)
- Speedier referrals. (GP x 2, Health visitor)
- To be able to refer to physiotherapy without referring to GP first. (Health visitor)
- To be able to refer directly to the obstetric physiotherapist. (Hospital midwife)
- To be able to refer to incontinence advisor without referring to district nurse first.
(Practice nurse)

3) In addition to those previously mentioned, other suggestions related to improving input from the physiotherapy service.

- Early physiotherapy help. (GP)

- More liaison with or input from physiotherapists. (Community midwife, Health visitor x 2)
- The physiotherapists to visit the wards for longer periods. (Hospital midwife)

4) Two suggestions revolved around improving the care for women for whom English was not their first language.

- More access to linkworkers. (Community midwife)
- Good simple leaflets in different languages. (Community midwife)

5) Another two suggestions were made:

- Anatomical models to explain pelvic floor anatomy. (GP)
- An incontinence nurse to conduct a clinic in the surgery. (GP)

7.5 Pelvic Floor Exercises

7.5.1 The Instruction Provided On Pelvic Floor Exercises

Eighty eight (69.8%) of the health professionals reported that they provided instruction on pelvic floor exercises. Thirty (23.8%) only recommended or reminded the women to do them, whilst eight (5.6%) did not provide any instruction or reminder at all. There were some differences according to profession.

Just eight reported that they did not instruct or recommend pelvic floor exercises to women with stress incontinence. These included five GP's (13.5%), two health visitors (5.6%) and one of the practice nurses (5.9%).

Table 7.11 The Provision Of Instruction On Pelvic Floor Exercises

	Yes	Recommend	No
	No. (%)	No. (%)	No. (%)
Hospital midwife	22 (88)	3 (12)	- -
Community midwife	9 (69.2)	4 (30.8)	- -
Health visitor	23 (76.7)	5 (43.2)	2 (6.6)
GP	16 (43.2)	16 (43.2)	5 (13.5)
Practice nurse	14 (82.4)	2 (11.8)	1 (5.9)
Physiotherapist	4(100)	- -	- -

7.5.2 The Programme Of Instruction Recommended To Women

The Time Spent On Teaching Pelvic Floor Exercises (Table 7.10)

The time spent teaching pelvic floor exercises ranged from less than five minutes to over half an hour, although over 80% of health professionals spent ten minutes or less on this activity.

Table 7.12 Time Spent On Instruction In Pelvic Floor Exercises

Time spent	No.	%
< 5	45	51.1
5 - 10	31	35.2
11 - 15	6	6.8
16 - 30	1	1.1
30+	1	1.1
missing	4	4.5

The Method Of Presenting The Information (Table 7.13)

There was no discernible pattern as to how each health professional presented the information, with the exception of the physiotherapists, all of whom used all the methods. The majority of health professionals taught pelvic floor exercises verbally.

Table 7.13 Method Of Presenting The Information

	Yes		No		Missing	
	No.	%	No.	%	No.	%
Verbal	78	88.6	6	6.8	4	4.5
Leaflet / written	59	67	25	28.4	4	4.5
Visual aids	11	12.5	73	83	4	4.5

The Exercise Regime

Unfortunately, a lot of information was missing with regards to the programme of exercises recommended by the health professionals. However, the information available did show that programmes varied a great deal between the different health professionals. Some stated that the programme they recommended would vary according to the ability of the woman to contract her pelvic floor muscles. The programme would therefore be built up over time. Three stated that their programme of exercises depended upon the woman concerned and therefore did not provide any more details. Three stated that they recommended the women to perform as many pelvic floor contractions as possible, or as often as possible in six cases. Where a range was given for any of the variables, the mid point was used for the purpose of analysis.

Table 7.14 The Recommended Length Of Time Per Day

Length. (minutes)	No. Health Professionals
2	3
3	1
5	4
7	2
10	4
12	1
20	2
25	2
30	1

Table 7.15 The Recommended Number Of Sessions Per Day

No. Sessions	No. Health Professionals
1	1
2	5
3	2
4	3
5	10
6	3
8	2
10	6
20	1

Table 7.16 The Recommended Number Of Slow Contractions Per Day

No. contractions	No. Health Professionals
2	3
3	2
4	1
5	4
10	10
12	1
15	1
20	3
As many as possible	3

Table 7.17 The Recommended Length Of Time A Slow Contraction Should Be Held

Length held {seconds}	No. Health Professionals
2	3
3	2
4	2
5	9
7	2
10	9
15	1
20	1
30	1

Table 7.18 The Recommended Number Of Fast Contractions Per Session

No. contractions	No. Health Professionals
1	1
2	2
5	1
7	1
10	4
20	3
35	1

7.5.3 Verification Of A Pelvic Floor Contraction (Table 7.17)

Sixty six health professionals (80.5%) reported that they checked on the ability of the woman to contract her pelvic floor correctly, although seventeen of these (19.3%) reported that they only did this occasionally. With the exception of the physiotherapists, all of whom checked the ability of the women to contract the pelvic floor, no pattern was found in the proportions of health professionals that did this.

Table 7.19 Verification Of The Ability To Contract The Pelvic Floor

Method	No. health professionals
interruption of midstream flow	65
palpation of vagina	9
palpation of abdominals	7
palpation of perineum	5
observation of perineum	3
withdrawal of tampon	2
perineometer	2
vaginal cones	1

7.5.4 Provision of Instruction In A Class

Twenty six percent of the health professionals provided some instruction on pelvic floor exercises in a class situation. Of these, ten were hospital midwives, seven community midwives, three health visitors, two were GP's and four physiotherapists. The programme of exercise each recommended varied greatly. The time spent teaching pelvic floor exercises ranged from less than five minutes to over thirty minutes. Sixteen (61.5%) provided a leaflet or written instruction, twenty two (84.6%) gave verbal instruction, eight (30.8%) used visual aids whilst five (19.2%) provided some form of physical instruction or biofeedback. The programme of exercise recommended to the women varied in terms of content according to the different instructors. The length of time which was recommended to spend on pelvic floor exercises ranged from five to thirty minutes each day and / or between two and ten session of exercises per day, or during each micturition. Between two and ten slow contractions were recommended per session and each slow contraction was to be held for between two and thirty seconds. The number of fast contractions recommended per session ranged from ten to twenty.

7.5.5 Satisfaction With The Programme Of Instruction

The following answers refer only to those given by health professionals who provided instruction on pelvic floor exercises. A total of thirty (34.1%) were satisfied with the programme of instruction on pelvic floor exercises that they were able to provide whilst fifty (56.8%) were not. (Information was missing in eight (9.1%) cases).

Seventy eight (88.6%) thought that the instruction they provided on pelvic floor exercises could be improved. Just seven (8%) felt that it could not. (Information was missing in three (3.4%) cases). The seven that did not feel the instruction could be improved were GP's (x3), practice nurse's (x2) and one hospital midwife and a physiotherapist.

A few suggested additional ways of improving the instruction on pelvic floor exercises. The ways of improving the instruction varied, with no two health professionals providing the same suggestion. The improvements suggested were as follows:

- More access to treatment cubicles and computer equipment. (Physiotherapist)
- More trained professionals to be distributed in the community clinics and attached to GP surgeries. (GP)
- Time to spend updating myself on the subject. (GP)
- Clear charts to show to women showing muscles and pelvic organs. (Community midwife)
- More input from the physiotherapy department. (Hospital midwife)
- Regular updating on changes through research. (Hospital midwife)

7.6 Comments About The Care Of Stress Incontinent Women

The survey ended with the question '**Are there any other comments that you would like to make about the care of stress incontinent women?**'. Altogether fifty two chose to comment further. Many made similar comments showing there were specific areas of agreement regarding the care of stress incontinent women.

A number commented upon the women's reactions to their condition and their acceptance of the problem or reluctance to admit to having the problem. Others wrote about the problem being a neglected one, with a resulting lack of awareness of the extent of the problem. Two health professionals believed that it was not a common problem in their sphere of practice.

Due to the reluctance of women to speak about the condition and the lack of awareness regarding the extent of the problem some health professionals felt the need to raise the profile of the condition, either with the public, or within the health professions.

Two believed that it was not a common problem in their sphere of practice. Others thought that treating stress incontinence was not a priority within their workload. Two health visitors were concerned that the women did not see them as the appropriate person to approach, whilst other health professionals queried or made suggestions about whose role it was to provide care for women with stress incontinence. Some were unhappy with their, or other health professions care for women with stress incontinence, or felt that further improvements were necessary, just two mentioned that they were satisfied with the services, or a particular aspect of the services.

A list of all the comments made can be found in appendix 12.

7.7 Summary

Findings from the survey showed that the services for women with, or at risk of developing stress incontinence, appeared to be uncoordinated. This was evident both between, and also within the different professions providing care for women at this time. Consequently there were gaps and also replication of services.

It is acknowledged that some members of the same profession may provide a different service to clients, e.g. the duties of the labour ward core staff differ in comparison to those of the team midwives. It is therefore not necessarily appropriate for all members of a particular profession to provide the same care with regard to stress incontinence

Some of the differences in care may be explained by different policies within the two different health authorities participating in the survey. Not all of the variations could however be accounted for in this way.

There was no defined course of action either between the different professions, or within members of the same profession with regard to the care for women with symptoms. Referral patterns also varied both between and within the different professions (although all hospital midwives referred to a physiotherapist during the postpartum period). In some cases, professionals referred on to a secondary source who also may have referred on. Neither was there any profession, with the exception of the physiotherapists, whose members all asked whether each woman had the condition even though it was acknowledged by some health professionals that women do not seek help for this condition.

Just over half of the participants surveyed were satisfied with the course of action they were able to take with regard to the provision of care irrespective of profession. However, the majority of physiotherapists were satisfied with the course of action they were able to take, whilst the hospital midwives and practice nurses were the least satisfied.

Suggestions for improvements made by the health professionals reflected the need to make the service provision more consistent across and within the different professions, and to improve the system of referral. Some professionals also wanted more input from the physiotherapy service.

The provision of information on pelvic floor exercises also appeared to be uncoordinated both between and within the different professions. With the exception of the

physiotherapists no profession provided one hundred percent coverage of information by all its members. The situation was further compounded because of the wide variations in the programme of instruction. Differences occurred with respect to all parameters measured - time spent teaching, method of instruction and content. Again, this occurred both between and within the different professions. The physiotherapists were the only profession whose members all performed some check to ensure they were being done correctly.

Over half the participants were dissatisfied with the programme of instruction they were able to offer and the majority felt that the instruction they provided could be improved. Given the opportunity to state those issues they felt to be important many professionals commented on the fact that women are reluctant to seek help or admit they have a problem with stress incontinence. Many professionals felt that stress incontinence is a neglected problem and that better care could be provided. In order to overcome this, and also to encourage women to seek help, a number of participants suggested that the condition should be given more attention, particularly in the public sphere.

Another issue regarded the role of care provider. Many questioned who should be providing the care, whilst others offered suggestions. Few felt however that the place of stress incontinence prevention and management should be located in their own sphere of practice. The uncertainty over the role of care provider appeared to be reflected in the current provision of care as shown in the results from the survey. The currently uncoordinated, and ad hoc provision of care appeared to result in individuals taking the responsibility on themselves without following a defined role.

Chapter 8

Results

The Impact Of Stress Incontinence

The following chapter presents the results from the interviews with women who reported symptoms of stress incontinence. Information presented in this chapter is designed to meet aims 3, 5 and 6 (see page 122). The chapter considers the services and instruction in pelvic floor exercise available to women and assesses whether it meets the womens needs. It also considers the effects of incontinence on the sufferer.

8.1 Three Months Following Delivery

Of the one hundred and eighty women with stress incontinence at eight weeks following delivery, forty two women returned the reply slip indicating that they were willing to be interviewed. This represented 23% of the women with stress incontinence. In terms of age, parity and symptoms they were representative of the larger sample (see table 4.4).

8.1.1 The Condition Of Stress Incontinence

Each interview began with the women being questioned as to whether they had received any information, either during their pregnancy or following delivery, about the condition of stress incontinence. The majority, (29) (69%), had not. One woman could not remember whether she had been given any information. The other twelve women (29%), received information either as a result of having asked a midwife (2), or having been provided with the information without asking (10). In two cases, members of the midwifery team provided it. Five women were given information on stress incontinence during an antenatal class and another two, at aquanatal class. One woman was given some information when she attended relaxation class.

The Content Of Information

The amount and detail of the information provided varied. Six women stated that it was only mentioned briefly or in passing, whilst three reported that they had had a great deal of information passed on to them. Some of the women who did not receive any information mentioned that they were aware of the condition anyway. However, others were not. Four of the women who were unaware of the condition stated that it came as a complete shock to them when the symptoms first began.

'You're worried - why is it happening? Why am I like this?'

'Just to be told during pregnancy so it's not a shock - just need reassuring, to be told during pregnancy. So many things happen after the baby so you need reassurance that everything's happening that's supposed to, or you are normal'.

The Need For Information

Most of the women felt that there was a need for information on stress incontinence to be provided during pregnancy. Twenty three women stated that they thought information would be useful, whilst nobody suggested that it wouldn't. The most important aspect, which was mentioned by 17 of the women, concerned the need for a warning that the condition could occur during pregnancy and / or following delivery. The word 'warn' was used in this context at least once during seven of the interviews. As already stated, for women who were unaware of the condition, it came as a shock. Yet they felt that this would not have been such a problem if they had had some warning that it could happen to them.

'would have been better to be prewarned because it came as a shock. Took a while to click on to what was happening....only advice is that it would be useful to be alerted to it as a possibility that it can happen'.

This view was also confirmed by women who were aware that stress incontinence may be a problem at this time. Ten of these women stated that it hadn't been so much of a problem for them because they had had prior knowledge.

'I realised what was happening, so it was easier to accept it'.

Opinion differed amongst the women with regard to how much information they should receive. This ranged from a detailed account of the condition to *'just to be told it could happen'*. Provided that they were warned, many women did not feel that they needed a great deal more information, although ten women mentioned that it would also be useful to be told what to do when it happened.

'just you may get it, this is what causes it and pelvic floor exercises can help. Then if people are concerned they can take it further'.

Another ten women stated that they also wished to know the causes. Five more said that they did not wish for a great deal of information on the condition, either because they were bombarded with information at this time anyway, or they felt that too much detail would make them worry.

'Just need to be told it could happen, if you tend to get too much information then you tend to worry about it'.

The Help Or Advice Given For The Condition

All of the women were asked whether they had received any help or advice for their condition (apart from the routine instruction of pelvic floor exercises). Although all of the women interviewed were suffering, or had suffered from stress incontinence to differing degrees, only seven of them had sought help or advice from a health professional, or had received any. Five women consulted with a GP about their condition. In four cases the GP had advised them to practise pelvic floor exercises. Two of these women were not satisfied with the outcome of this visit.

'said it was just part and parcel of having children and to do pelvic floor exercises. I felt as though I shouldn't be mentioning it and 'go away'. Nobody checked to see if I was having a problem'.

One woman was given tablets by her GP to stop her vomiting as this provoked episodes of stress incontinence. Another woman had a prolapse and was referred by her midwife to a gynaecologist. A fifth woman spoke of her condition with a midwife but the outcome was not discussed within the context of the interview.

The Reasons Why Women Did Not Seek Help For Their Stress Incontinence

The thirty five women not seeking help put forward a variety of reasons for this: Thirteen felt that the condition itself was not causing them a problem, or that it was only a minor problem and thus they didn't require any help. Another woman felt that because it was a minor problem she shouldn't, or couldn't seek help, but admitted that she would have liked it. Two women reported that it had not occurred to them to seek help whilst others stated that they knew that the condition could be helped by pelvic floor exercises and didn't feel that anyone could provide further assistance. Many other women inferred that they would have liked to ask for help but did not. A number of reasons were given to explain their reluctance in seeking assistance. Two women stated that they did intend asking for help but changed their minds. The following explanations were provided:

'The GP didn't ask if I was OK I was going to mention it but it was a bit embarrassing. If he's going to ask then I'm quite willing to talk about it'.

'I was going to mention it but the GP said 'everything's fine' and I didn't want to say 'everything's not'.

Similar reasons were mentioned by the other women not intending to seek help. Nine women stated that they were uncomfortable mentioning the problem to someone, eight of them suggested that it should be mentioned by a health professional in the first instance. For most of these women, being unable or not wishing to communicate that they had a problem with stress incontinence resulted from the nature of the condition itself. It was commonly seen as an embarrassing condition to have and talking about it was equally embarrassing for many women. This was specifically mentioned as an issue in seven of

the interviews. A few women gave alternative reasons as to why they did not seek help or advice. One woman said

'it feels like an admission of not coping'.

whilst the rest gave reasons relating to the dissatisfaction with health professionals,

'he (the GP) doesn't seem to have the time of day'

'they (the health visitors or midwives) focus upon the baby rather than the mother'.

and *'possibly nobody was approachable enough'.*

The Role of The Health Professional

During the course of the interview the health professional most frequently referred to was the GP. This reference was made in a number of contexts in which the GP was identified as the person that help was sought from (four women), or would be sought from if necessary (four women). Eight women said that they would mention their condition to their GP if he / she had broached the subject first. Five women referred to the GP as someone they would not seek help from. There were different reasons given for this. Two women were not comfortable with their GP being male. A third woman said

'I didn't really see my GP during pregnancy so I wouldn't choose to ask him about the problem'.

Another felt he was there *'purely to deal with medical problems not things like stress incontinence and pelvic floor exercises'*, whilst the fifth woman said *she 'wouldn't put much faith unless it's a serious problem'*.

Five women expressed their surprise that the GP did not ask this information at the time of the six week postnatal check, or suggested that it would be appropriate for the GP to check at this time whether she was doing pelvic floor exercises and whether she had had a problem with stress incontinence.

Seven women mentioned that they thought their midwives would be a good source of help. They believed that it was their field of knowledge.

'the midwife was my bible rather than the doctor because that's what she deals with'.

In contrast to this, three women reported that the midwifery service signed them off too soon for them to be able to seek help for the condition. Two other women felt that the midwives were more interested in their child rather than the women's' own health and would not approach them for this reason. A further two women said that they would contact their health visitor if they had a problem with stress incontinence, whilst another said she wasn't *'necessarily sure what you do use a health visitor for, possibly just for the child'*.

8.1.2 Pelvic Floor Exercises

1.2.1 Information on Pelvic Floor Exercises

There appeared to be no consistency with regard to the information that was given to women about pelvic floor exercises. Some women were given a lot of information from a

they had
received

Some of
had seen

to follow

Seventy

exercised

women

the best

'I was told

the information

satisfactory

just given

something

'On display

read it.

information

high after

you'.

Altogether

information

The other classes in which

(three women), NCT classes

classes (three women).

and consequently received

Few women received in

health checks, although

clinic, or on a home visit

instances the women received

ranged from

'at the first midwife visit

the pack with other leaflets

to

'the midwife told me to

getting it across just by

doing them.

Information during the

Most, but not all of the

during their stay in hospital

having received a leaflet

same leaflet within 3 weeks

number of different sources during

contrast, other women received

postpartum were just left a leaflet

delivery. Three women stated that

pregnancy or following delivery. A

information apart from a reminder

One of these women suggested

pregnancy.

Information provided during the antenatal

Twenty two women reported that

exercises during their pregnancy

during this period came from the

provided information to the greatest

information appeared to vary. In some

information, whilst in others it was

case where a woman felt that the information

'The physio, apart from saying when

the muscles contracting if you go

She had diagrams she'd photocopied

how to do them and how often. So

could feel the muscle, tried to explain

can feel it. She said to do them even

having dinner, short ones hold for

you're on the toilet.

midwife did talk through the leaflets with them and explained how the exercises should be done.

One woman commented

'..but the handout's don't detail what to tighten, just said pelvic floor but didn't say what the pelvic floor is. Need to explain what the muscles are'.

One woman made the vital point that *'nobody checked to see that I could read'.*

Following discharge from hospital, some of the women were asked if they were doing pelvic floor exercises, or they were reminded to do them, by either a midwife or health visitor. As with the instruction on pelvic floor exercises, this reinforcement appeared to be inconsistent, as not all women were approached in this way whilst some women had reminders from more than one health professional. A total of ten women mentioned that the midwife spoke to them about it whilst five reported that a health visitor did. In two cases both the midwife and health visitor had checked that the woman was exercising her pelvic floor muscles. One woman mentioned that her GP had asked her during the six week postnatal check whether she was doing her pelvic floor exercises. Four women volunteered the information that nobody had reminded them or checked to see if they were doing them correctly.

Seven women suggested that they received little information because they were not first time mothers. They felt that the health professionals assumed they knew what to do from previous experience although they themselves did not feel this to be the case. Two of these women requested information from the midwives as they had not received any. Other comments that were made were:

'They possibly assumed that someone with seven children should know what they're doing but it shouldn't be assumedit's always assumed because I've got a lot of children and I'm educated that I'm going to pick up on things but there's always a new situation to crop up and I'm likely to panic as the last person'.

'Information would have been useful because it's been four years since J (previous child) and so would have refreshed my memory because everything's changed since last time. Would have preferred someone to have said that the information has still not changed i.e. to still do pelvic floor exercises etc., reassured that not changed'.

Suggestions On How To Improve The Services

Part of the interviews focused upon the ways in which the information could be improved - if this was felt to be necessary. Five of the forty two women interviewed felt that the service they had had could not be improved. They made comments such as:

'The care I got before and after was good. It was sufficient, I understood it, thought the physio was brilliant, she couldn't stress it enough'

and

'The info I had was excellent. Don't know what more they could do in terms of exercises'.

All of these women had attended antenatal or aquanatal classes (both in some cases). During these classes an explanation was given as to why they needed to do pelvic floor exercises. They were also instructed in how to do them and some time was spent

practising the exercises. The women also received leaflets during their stay in hospital, and had a midwife, health visitor or both, remind them of the need to practise the exercises. One of these women was also visited by the physiotherapist whilst she was in hospital who

'went through them briefly because I already knew about them'.

Despite this, only three of these women performed pelvic floor exercises everyday in the later stages of pregnancy whilst two did them occasionally. Following delivery just two women continued to do them everyday whilst three practised them occasionally.

The remainder of the sample felt that the services they had received had scope for improvement. Although a wide range of issues were discussed, there was a consensus of opinion over some of the issues which were raised. Four main topics emerged. Within each topic several suggestions of improving the services were made. These were:

- a) the importance of doing pelvic floor exercises
- b) the way the information was given
- c) the timing of the information
- d) whether the exercises are being performed correctly

A fifth topic, mentioned less frequently than the others, was the content of the instruction.

These will be discussed in detail below:

- a) By far the most important issue to emerge from the interviews with regard to service provision, was the need to stress the importance of doing pelvic floor exercises. Eighteen women mentioned this during the course of their interview. Two ways of stressing the information were suggested. Fourteen women, thought that the consequences of having

stress incontinence should be stressed, along with the importance of doing pelvic floor exercises to prevent or alleviate the problem. The following quotes illustrate this point.

'They (health professionals) don't stress the incontinent side - just to get everything back in place. Don't know if everyone's aware of it.....the fact that you're going to wet yourself every five minutes is not mentioned.They should stress more on the problems that you can have. When you're young you think it won't happen to me'.

'...and unless they say 'this is important' you don't tend to focus on what comes after the birth. Seems abstract and not important.....Needs to be stressed more. Maybe bringing in that research has shown that out of twenty of you here then four of you will have a problem etc. Give it that status so important. At the moment it's just not got importance'.

The other way in which the importance of pelvic floor exercises could be stressed was by continually reminding women to practise these exercises. Six women suggested the need for this course of action during their interview.

b) Another important topic to emerge concerned the way the information was presented to the women. Half of the women interviewed requested that the information be given verbally. Many of these women went on to say why this would be beneficial. The reasons were threefold. First, it was felt that the information was understood more easily when explained in person. Secondly, it seemed to add more emphasis and therefore helped to stress the importance of doing them, and lastly, it provided the opportunity to ask questions. Five women also stated that a handout should be provided as well, in order to reinforce the verbal information, and which could be perused at a later date. Six women

thought that the information should be given in a class situation. This would provide an opportunity for the exercises to be performed alongside an instructor.

c) As already stated, a number of women did not receive any information during the antenatal period, instead most women received a leaflet whilst they were in hospital at the time of delivery. A number of women thought this was an inappropriate time. Eleven women requested that the information should be given during the antenatal period. The following reasons were given: A number of women experience problems at this stage, practising the exercises antenatally could help get women into the routine of doing them, and lastly, women are more receptive to the information at this time because *"all hell breaks loose after delivery"*. Most women did not state whether there would be an optimal time during the antenatal period to provide the information although, a couple did.

'If you're told verbally or given information early on in pregnancy then it would have made a difference to the way of doing things. It's alright saying do them but need information at the start rather than 40 weeks later'.

'Should be told much sooner - even at the first check up at hospital with the midwife, it's an exciting stage so it would be good then, when you can't wait for things to happen, you're listening then and want all the information, whereas at the end you feel like you know it all or have done it all'.

Three women also suggested the information could be repeated after the birth

d) This topic was mentioned in two contexts. Firstly, seven women specifically suggested that someone - usually the midwife - should check to see that the women were doing the

exercises correctly. For some women a check seemed to consist of having someone on hand to provide instruction whilst the exercises were being performed. Others described a physical check:

'thought it would have been better if someone was there when you're doing the first exercises to see that you are doing them properly. Somebody just feeling you to see that you're pulling in the right muscles'.

Six more women, whilst not specifically requesting that someone should check they were doing them correctly, did state that they weren't sure if they were doing them properly.

'You don't know if you're doing it the right way'

'Still don't know if I'm doing them right'.

e) Whilst few chose to mention the contents of the instruction, three issues were brought up by a small proportion of the sample. These were: the instruction should be more in-depth or explicit. Whilst three women suggested this, none of them specified the way in which the content should be expanded. The second issue was the need to explain in more detail which muscles were involved in performing the exercises.

'They usually say just tighten everything up but nowhere do you hear which muscles to use. Need more detail on how to do them and what muscles to use - vaginal muscles and pelvic floor because not sure what pelvic floor muscles involve'.

Lastly, two women also requested that information should be given on the frequency in which the exercises should be performed.

Performing Pelvic Floor Exercises During Pregnancy

In thirty eight of the forty two interviews the women were asked, or mentioned, the frequency in which they did pelvic floor exercises during their pregnancy. The answers varied, ranging from never to several times everyday. Altogether a total of twelve women stated that they performed pelvic floor exercises everyday, although nine of these specified that they had only started doing them that regularly towards the end of their pregnancy. They were often spurred on because they had had a problem with stress incontinence at this stage. Fifteen women performed the exercises on a less regular basis, such as

'whenever I remembered',

'probably just once per week but gave them a good flex'

and 'I would forget for one week then do them everyday for another week'.

The issue here seemed to be remembering to do them. Just two women stated that they did them only as part of a class. For one woman that meant she did them every week at the end of her pregnancy whilst the other did them only on one or two occasions. Nine of the women reported they had not done any pelvic floor exercises during their pregnancy. Two of these women offered explanations:

'Tried doing them during pregnancy but felt uncomfortable'

'I asked myself (the hospital midwives during a check up) during the end of my pregnancy because I had symptoms. Was told to do pelvic floor exercises. I said I heard about them but not how to do them. They said 'you will be told after you've had the baby'. At the time I was satisfied with this because I thought I would get the information afterwards, looking back it wasn't satisfactory at all'.

Performing Pelvic Floor Exercises In The Postpartum

All of the women were either asked, or they mentioned, whether they had performed pelvic floor exercises following delivery. The answers varied enormously from several sessions everyday to not at all. Many women described their performance as inconsistent, usually due to the fact they did not remember to do them regularly. Overall, the answers seemed to fall within four broad categories which are described as follows: Twelve women reported that they did pelvic floor exercises everyday although some of these women did a few sessions everyday whilst others did just one.

'Started two days postpartum then properly 5 days. Do them regularly now up to 50 plus per day'.

'After - a couple of times a day. Then since the health visitor showed me how to do them, four or five times a day correctly!'

Nine women described carrying them out regularly in the first weeks following delivery but much less frequently by the time of interview.

'After the birth I did them every hour in the beginning then everyday. Now it's whenever I remember'.

'Did more at first after the birth but slackened off but too many things to think about. Did do them everytime I fed (the baby).'

Sixteen women described an inconsistent routine of pelvic floor exercises. These were undertaken on a weekly rather than a daily basis. Whilst some women managed to do them two or three times a week, for others it was even less than this. The difficulty appeared to lie with remembering to do them, or to a lesser extent, finding time to do them. Just over half of all women, twenty two in total, made some reference in their interview about remembering to do pelvic floor exercises. Some women simply stated that they did them only when they remembered, whilst others directly spoke about the difficulty they found in remembering to do them. As such, descriptions of their routine were similar to those illustrated below:

'Do them now but not regularly - forget to do them. Try to do them everyweek but so busy doing other things'.

'do them when I think about it - probably twice per week. If I remembered I'd do them more often'.

Five of the women had not done pelvic floor exercises. One woman stated that she'd done other exercises so didn't feel it was necessary. Two other women gave reasons for not doing them which were as follows:

'Afterwards the baby was so active that you don't get five minutes for yourself'

and

'No, I don't do them. If I'd been told that they might make a difference then might well have done them'.

Although only one woman gave this as a reason for not doing pelvic floor exercises when specifically asked whether she did them, a number of other women made a similar comment during the course of the interview. It thus became apparent that some women did not realise that doing pelvic floor exercises could benefit the condition of stress incontinence or had not realised it until some time later. A total of nine women mentioned this issue at some point during their interview.

'Just thought it was to strengthen muscles....Didn't have a clue that pelvic floor exercises were for stress incontinence. Seemed just to tighten up muscles, so you think what the hell!. If people explained how important they were for stress incontinence and told you what it meant then women would do them properly.....Wasn't aware that pelvic floor exercises help stop stress incontinence'.

'Would be more motivated if I was told why they are needed and what would happen if I didn't do them. Not aware of why or how to stop it, didn't connect the two so if I did connect I would have been more inclined to do something'.

The Motivation For Practising Pelvic Floor Exercises

Many women described what motivated them into doing pelvic floor exercises. Four main reasons emerged. The reason most frequently cited was the connection between stress incontinence and the need to alleviate the problem at the present time. Eighteen women mentioned this as a reason that they did pelvic floor exercises.

'...I felt like I had loss of control. Worried a lot so spurred on. It gave me the incentive to do it'.

'I'm worried in case, if I feel the slightest need I can just walk along and leak'

Nine women mentioned that they did them because they were told to do so - this was not the primary reason but did provide added incentive, particularly when more than one person stressed the need to do them. Although in five instances it was a health professional/s that provided the impetus, mothers (two) a sister and a friend were also responsible.

'I started doing them initially because people said to do them. Because I kept getting the same information from lots of different sources'.

Another reason that women chose to do pelvic floor exercises was to prevent problems occurring in the future. This was mentioned by seven women as the main reason that they did the exercises.

'A friend said I would have problems in the future - everything could drop out! I fear of incontinence in the future'.

Finally, three women reported knowing one or more people who suffered from stress incontinence. Their experience had had the effect of motivating these women to do exercises as they did not want to end up with similar problems.

'Because I know people that haven't done them and have horror stories, also my mother thought she would need an operation but did her exercises and doesn't need one now. Also I thought 'Oh God I don't want to be like that'.

Focusing On The Child

Another theme which emerged from the interviews concerned a focus on the child. There were two main issues which the women discussed in this context. The first related to the attention given to the child (even before it was born), to the exclusion of the health of the women themselves. Eight women mentioned this in their interview. They felt that the health professionals concentrated on the child during pregnancy and more so afterwards. Sometimes the women themselves also focused upon the child to the exclusion of their own needs. The following quotations are used to illustrate this point.

'the midwives, doctors etc. tend to concentrate on the baby and you're ignored'

'They talk a lot about other things but not the women's' body after the birth, nothing taught at antenatal classes, only talked about the birth and the pregnancy....Tend once the babies born to just do whatever's good for the baby'.

The child was also mentioned in another context: Many women talked about not having the time or the energy to do pelvic floor exercises as a consequence of either pregnancy, or looking after their child. This was mentioned in eight of the interviews.

So busy that you don't remember things, at the end of the day you're shattered. I think that I'll set aside time to do them (pelvic floor exercises) but that ten minutes never seems to happen'.

'I stopped doing them (pelvic floor exercises) so often because of the time. I was shattered in the evening, don't have any part of the day without a child'.

8.1.3 The Effects of Stress Incontinence

All of the women were asked to describe how having stress incontinence affected them. Their answers were varied, with a range of situations and emotions being described. For some women, stress incontinence had had a great impact on their lives both in terms of their daily routine and also in terms of psychological stress, exerting a constant and deep mental worry. In contrast, other women spoke of it in terms of a minor inconvenience which rarely disturbed their routine and was something that they rarely thought about. The following quotes illustrate the contrasting situations.

'it's a constant worry.....It affects my whole life. My biggest fear is having a leak when my husband and I are making love, it overshadows the proceedings slightly....It's quite frightening. Makes me depressed from time to time. I sometimes get angry when my husband makes a joke of it. When I'm home there's no difference but when I'm out. You're aware of it all the time, worried of having a wet patch on my skirt. My biggest worry is everyone else knowing about it.

'Just thought 'oh god that never used to happen'. Didn't pay much attention in a way, mentioned it to friends in a jokey way, didn't bother me much. Did see things in magazines so I realised that's what it is, so not something completely unusual'.

It was interesting to note that the majority of women first described their condition in terms of its practical effects. Few women spoke of how the condition affected them psychologically

until they were specifically questioned about it, yet a number of women did later reveal that the condition affected them in a very negative way.

Three major themes were used by the women to describe their experiences of stress incontinence. These were: *daily life, contextualising the problem and feelings and emotions.*

Daily Life

A pattern emerged in response to the broad question asked about the effects of stress incontinence. The women usually chose to answer first by summing up whether it had been a problem for them or not, then followed this by talking about the condition itself - the degree of leakage, frequency of occurrence and in particular the activities which made them leak. This section of the interview commenced in this way in a total of 25 instances. Whilst a variety of activities were described, as was the severity of the condition, the most common reply was that a cough, (or laugh or sneeze), always provoked leakage.

'Not really been a problem since birth. During pregnancy I did have to think before sneezing or laughing 'cause I had to control it. know that if I didn't think beforehand I leaked a bit'.

'Not really been a problem antenatally but afterwards!. Antenatally in the later stages some slight leakage but not a major problem, only if a vigorous sneeze etc. Postnatally it was more of a problem in the immediate aftermath of the birth'.

The range of activities which were mentioned as provoking stress incontinence were as follows: Sneezing (twelve women), coughing (ten women), aerobics (six women), laughing

(five women), running - usually for a bus (five women). Also mentioned by just one or two women were vomiting, bending down, picking things up, swimming, raising a voice and sleeping.

The women also described their ways of coping with the condition. This was most often in practical terms, such as being prepared in case of accidents. This meant the wearing of pantyliners or sanitary towels, or frequent emptying of the bladder and the avoidance of certain activities. During the course of the interview fifteen women spoke of having to wear a sanitary towel or pantyliner. For many of these women it was an everyday occurrence as they *'always had to be prepared for an accident'*. Others just used protection at specific times such as when they had a cough or cold.

'Have to wear a pad outside the house. It's not even a question of having a full bladder. At the moment I have a cold so have to wear a pad in the house in case it happens when I cough'.

'I would wear pantyliners cause I never knew what was going to happen'.

'I was wearing sanitary towels anyway, in bed was fully kitted up'.

Some women, five in total, spoke of frequently emptying their bladder to avoid leaking.

'I was always aware of the need to go to the toilet and empty my bladder just in case'.

Whilst some women mentioned activities which triggered episodes of incontinence others spoke in other terms of activities and situations which they had had to avoid. This

appeared to be one of the major effects of stress incontinence. The restrictions it placed on women's lives were enormous in some cases.

'I used to do step aerobics - can't do that at the moment. Even going to work I have to use protection - it costs a fortune. Won't go swimming, dad has to take the children. I need protection if I go shopping or go out for the day. Won't go on rides in Alton towers. Problems if I have to run after my 2 year old. I can't run at the minute or run for the bus. Sometimes happens when I raise my voice, sometimes no warning. More embarrassing when you're shopping, there's nothing you can do. Can't laugh cough, anything like that. It's restricting - you always need to think what to take with you when you go out. Before I would go anywhere, do anything, now I always have to think'.

Fourteen women spoke of being restricted in one or more ways by their condition. This was usually in terms of being unable to do physical activities. In addition, three women said that whilst they were not restricted in any way because of their condition, they were currently doing little physical activity due to having recently given birth.

Five women spoke of how having stress incontinence restricted their role as a mother to their other children. They were unable to play with their children in a number of ways because activities such as running, chasing and even laughing, caused leakage.

'My little girl's eight now and I can't run around and play with her. If she says 'race you' I say 'no - you'll have to race your dad'.

Contextualising the Problem

Only four women used the term 'stress incontinence' during the course of the interviews. Most frequently the term 'it' was used, occasionally women spoke of 'leakage'. This appeared to disassociate the women somewhat from their condition. It also had the effect of making the condition appear less serious.

Some women were able to contextualise the condition as being part and parcel of pregnancy or a consequence of giving birth. Those who voiced it in this way appeared able to view the problem as rather inevitable. Because of this it seemed to be less of a concern for those women. Eight women spoke of the condition in this way.

'It didn't matter during pregnancy because you don't need to explain it to other people'

'it was a concern but if you think you've just had a baby and all it is is this then.....'

'I did think more about it because my baby presented the wrong way and I had difficulties, eventually he came out in one push and I had problems and needed a lot of stitches so I thought it would be more likely that I had problems'

Contrasting attitudes were displayed with regard to how the women accepted the condition. Four different ways of confronting the problem were evident. A small number of women, three in total, mentioned that they saw the condition as becoming less of a problem to them because they had learnt to accept it. This however was due to the fact that they had had the condition for a while and had got used to it during this time.

'I think I've learnt to live with it and know that I can't run, know that I will wet myself when running. Will always have to wear a pantyliner.'

'Not really a problem anymore because I'm used to the way I am'.

Another three women spoke in terms of not being able to accept it and worrying that it didn't seem to be going away.

'It does get you down all the time. I was sick of it and kept thinking why doesn't it go away or when?. I kept thinking this is it'.

In contrast, six women were positive that the condition would ease itself and were therefore not too concerned about having stress incontinence.

'It was not really a worry because I thought it just happened and would sort itself out'

Lastly, seven women spoke of not letting it become a problem. Two of these women said that they would *'do something about it'* whilst the others said that it was not in their nature to let it become a problem.

'Won't let it become a problem, it's not in my personality, will always find ways round it'.

'I coped with it because I do cope with these things'.

Some women felt able to talk about their condition with their partners and families. In some cases their families were good sources of information about the condition, and also helped to remind or motivate them into practising pelvic floor exercises. In a couple of

instances the women spoke of how it helped them to be able to discuss their condition with a member of their family

'was concerned about it until I spoke to my sister because I was embarrassed about it. Too embarrassing - especially if you have company. When my sister spoke about it, it helped'.

In contrast to this, two women spoke of wanting to keep their condition hidden. This included not wanting their husbands to know that they had stress incontinence.

'Mentally a problem, yes. Because as long as nobody knew - so in a way it was a problem. Didn't want my husband to find out'.

Two other women spoke about their annoyance with other people's reactions to their condition. They felt that their problem was trivialised because it was treated in a humorous way.

'I sometimes get angry when my husband makes a joke of it'

'People laugh as if it's some sort of joke - even my boyfriend. I use to say don't laugh at me'.

Five women blamed themselves for their condition, saying it was their fault either for not seeking help, or alternatively not doing exercises (often enough).

'Sometimes I think it's my own fault, that's why I've never pushed it, cause I've never done these exercises so the Dr would say if you've done pelvic floor exercises then you wouldn't be here, so it does stop you mentioning it I suppose'

Feelings and Emotions

A range of feelings and emotions were described, although some of these were common to many of the women. In particular, eighteen women spoke about being worried by some aspect of the condition. There were numerous reasons given for this, which were as follows: The fear that the condition was not going to get any better,

'it wasn't that drastic, more that you're worrying about it, getting upset about it because I thought it wasn't going to go away. It was worrying because I thought it was going to control my life. I definitely did feel really low and worried about it'

or, the fear that it was going to get worse in the future.

'What did worry me once it happened was what will happen in the future? Will I have to have an operation?'

Women also described worrying about leaking, particularly at an inappropriate time or place.

'on social occasions - at Christmas I was very concerned during my husbands work party. You're aware of it all the time, worried of having a wet patch on my skirt'.

They also worried about other people finding out that they had the condition.

'My biggest worry is everyone else knowing about it'.

Lastly, three women spoke of their worry that they would leak during sex.

'it's a constant worry.....It affects my whole life. My biggest fear is having a leak when my husband and I are making love. It overshadows the proceedings'

Whilst some women worried about the condition, others appeared to be less concerned to a degree, although in many cases it was something that they acknowledged being conscious about. Rather than actively worrying about it, seven women spoke in terms of just having an awareness of it.

I wouldn't say it's a problem, but I know that it's happening'

'I wasn't depressed, more fed up of it, conscious of it all the time'.

Many women described feelings of embarrassment in connection with their condition. Thirteen women mentioned this during the course of their interview. Whilst some of the women spoke of their embarrassment in talking about it to someone, others were simply embarrassed by having the condition.

'Just fed up and embarrassed about it'

'It's an embarrassing problem'.

Whilst the above narrative has mostly described the problems and negative feelings that women associated with having stress incontinence, it is also important to note that a minority of women (six in total) described a slightly different picture. These women talked about rarely being inconvenienced by the problem and were not particularly concerned about it. The following quote is used to illustrate this point.

Just knew I was leaking a little bit, thought it would clear up and it did. Slight, so it wasn't anything that worried me. Might have worried if hadn't had all the info.No, it had no effect on my activities'.

8.2 Interviews One Year Following Delivery

Of the sixty nine women with stress incontinence one year following delivery, fifteen women returned the reply slip indicating that they were willing to be interviewed. This represented 21% of the women with stress incontinence. They were similar in age, parity and symptoms to the larger sample.

8.2.1 Stress Incontinence

Information On Stress Incontinence

Many of the findings from the first interviews were apparent in the second interviews. This was true with regard to the information on stress incontinence. Only two of the fifteen women had been given any information on stress incontinence during pregnancy or following their delivery, yet all of the women agreed that some information was needed. None of the women had been given information during the intervening period between interviews one and two.

The Need For Information

Similar to the first interviews, eight women suggested that there was a need to warn other women that stress incontinence could occur during pregnancy or following delivery. Three women also said that it would be useful to warn other women that stress incontinence could occur during sex. It was felt this would help others by letting them know that they were not the only person who had problems at this time. This would also make it easier for women to seek help. However, only one of these women did state that she herself was having a problem with stress incontinence during sex. Unlike some of the women interviewed previously that had had a problem with leakage during sex, it was not something this particular individual appeared to worry about.

Five women voiced the need to make other people aware of the condition in order that it should become less of a taboo subject. It was thought that this would enable other women to seek help, or to feel less embarrassed about their condition.

'Think it needs to be a bit more information about it, needs to be made much clearer, they should give more information. If women need to ask about it - made aware so they feel that they can go and ask them. Could do with advertising it a bit more, in clinics and that, some people find it embarrassing so maybe if women did see it they'd probably feel a bit more comfortable and can go and talk to someone'.

Ten women stated that a health professional should enquire whether they were having a problem with stress incontinence. It was felt this would enable women to talk about their condition and receive reassurance or help, if necessary. Two of these women suggested that it should be made at the six week postnatal check, whilst the others felt that it should occur much later in the postpartum period. Two women spoke of the need for the information on stress incontinence to be made available in other languages. As a number

of women using the services do not have English as their first language they do not attend antenatal classes for example, where much of the information was provided.

The Help Or Advice Given For The Condition

Similar to the women interviewed at three months postpartum, few of the women had sought help for their symptoms of stress incontinence. This was despite suffering from the condition for at least one year. At the time of the interview one of the women had made an appointment to see her GP, whilst two others had already consulted their GP about it. Only one of these three women had specifically visited her GP about the condition. She also stated that *'the doctor was a woman and I knew that she'd had children herself so I specifically asked for her'*. This factor appeared to have made it easier for her to seek help. The other two women did not go (is not going) to see their GP specifically about their stress incontinence but mentioned it (or will mention it) whilst they were there.

'didn't go specifically. Mentioned it whilst I was there about 6 months after the baby was born. Wouldn't have gone otherwise. (Why not?). Don't know, no particular reason. Possibly would have thought that I wouldn't get anywhere, wouldn't think it was important enough to actually go'.

'I haven't gone before because you always think it's going to go away. I have to do something because it's not gone away. Other things happened since the birth so it was put aside....decided to go cause it's been over a year and I'm also going to see the GP about something else anyway'.

On visiting her GP six months after the birth, one of the women was told to try and do pelvic floor exercises. If that course of action failed she could be referred for

physiotherapy, or even an operation. The woman reported that she had felt this advice was satisfactory at the time. The other woman who had seen her GP, first visited him / her at two months postpartum. She was told *'to give it a little more time but to come back if it hadn't cleared within a couple of months'*. Five months later she went back to her GP and was told to do pelvic floor exercises and *'other exercises which I had not been told about before. If it got severe I could use the cones but that was only in severe cases'*. The GP also reassured her by explaining that having two children close together meant that it could take longer for her body to get to return to normal. Again this was felt to be satisfactory.

Five women also mentioned that their GP had asked a general question about how they were. However, none of the women felt they were able to mention about their stress incontinence in reply to this. Instead they gave an automatic response that they were all right. The women inferred that had they been asked a direct question about stress incontinence they would have felt able to answer truthfully.

'When you're asked how you're doing just think it's a general comment and don't say'.

'They always say 'how are you' but you just say OK.....just do you feel OK, right, fine. Didn't ask about stress incontinence'.

The Reasons Why Women Did Not Seek Help For Their Stress Incontinence

Reasons similar to those given at three months postpartum were reported one year after the birth. Of the twelve women who had not sought help, eight of them said that they had not thought it was a big enough problem or that their condition had not got any worse.

'Not seen anyone because it's only very occasionally, not really a problem, only when I get out of the bath'.

'I used pantyliners anyway, just got used to it, not so severe that I worried about it'.

However, despite their response to this question, four women, during the course of their interview, described a situation suggesting that their life was affected by the condition to some extent.

'is a bit of a problem, not that big a problem, but it is a bit of a problem.....just when I go out and sneeze. That's what worries me. I think that knowing that it's happening, and other people - the embarrassment'.

'has been a problem, now and in the past. Easier to cope with now because I was aware beforehand so you develop mechanisms, so I don't have too many accidents.....Probably aware of it everyday to some extent, actively think to go to the loo, so it is on my mind.just occasional embarrassment or discomfort, can't go off and get changed, and the knowledge that it can be a problem. Worry about others finding out, it should be happening to me. I feel uncomfortable at times, can spoil a day out because of it'.

Four other women said that they had not sought help because they were too embarrassed. This was despite the effects of the condition -

'At times I did feel drastic, thought it was awful and really wanted help'.

'My husband kept saying I think you should see someone - I did think about seeing somebody but - the embarrassment!. Now all the months have gone by and I only think when it happens - this is terrible'

In addition to the embarrassment, two of these women also spoke of not wanting to see their GP because

'Feel they're not approachable enough'

and 'I would die before going to see my GP. I hate our doctor with a vengeance.....Still wouldn't go if I had a different GP'.

Another factor which may have caused further reluctance to seek help was the anticipated response from the GP. Four women indicated that they felt their GP would not think it was a serious enough problem. Whilst no woman gave this as a direct reason why they did not seek help, a number of comments were made in this vein, such as

'You feel like you're taking up their time, it's not really an emergency'

'wouldn't expect a GP to be interested in' (stress incontinence)

Losing Contact With Health Professionals

There were other issues that caused the women to feel dissatisfied with the health professionals involvement. These were; the health professionals appeared to lose contact with the women soon after they gave birth and, the health professionals seemed to focus on the child rather than the women's' needs. Both of these issues were also commented upon during the first interviews.

In the course of the second interviews, five women mentioned that contact with the health professionals ceased soon after their child was born, particularly in respect to their own needs. This appeared to make it even more difficult for the women to seek help.

'By three months I think you've lost the attachment from the hospital. Completely cut off from pregnancy, now I've had the baby and nothing to do with you.....Completely cut off from all information. Only magazines for information. If there was just one person I could have asked'.

'Angry that after 6 weeks or so if things seem all right you're left high and dry to get on with it. If you just had a bit of time with health visitor or doctor or someone you can relate to. Just that aftercare that annoys me. You get left'.

The Focus On The Child

Six women spoke of the tendency for the health professional to concentrate on the child rather than the woman's needs. This also appeared to have had the effect of making the women feel less inclined to approach the health professionals about their own problems.

'When there's too much going on they just think about the baby - never mind what your bladder's doing'.

'The midwives and health visitors - think they're more interested in the baby'.

Unlike the interviews carried out in the postpartum, the women did not speak about not having the time or energy to do their pelvic floor exercises because they were looking after their child. It thus appeared that their routines were more settled by this stage.

Multiparous Women

The issue of parous women receiving little information, which emerged during the first interviews, was confirmed by two of the women taking part in the second interviews. One of these women was currently pregnant and spoke of being surprised that she had had no information this time around.

'Other women will have the same problem, the muscles have weakened and you almost expect the health professionals to pick up on that and check....Since it's the same team (of midwives) you wonder whether a lot is presumed that you know it all by now. Even if you're just asked how it was you'd feel reassured they were concerned about it'.

8.2.2 Pelvic Floor Exercises

Information on Pelvic Floor Exercises

Women were asked about the instruction they had received on pelvic floor exercises. The answers they gave were very similar to those given by the women interviewed in the early postpartum i.e., there was little consistency in the information that they received. Only the

two women who had visited their GP about the condition had received any more information on the exercises during the intervening period.

Performing Pelvic Floor Exercises

At the time of the second interview none of the women were practising pelvic floor exercises with any regularity, although nine of the women said they did them occasionally such as,

'once in a blue moon'

or *'I remember when it's mentioned'*.

Since visiting her GP one woman did them regularly for a while.

'I did them whenever I could. She told me to do them when washing up and going up the stairs and it just automatically clicked. Washing up, when the kids went to bed, 10 minutes of pelvic floor exercises and as many times during the day. I don't do them now, I don't need to do them'.

One of the women reported that she had never done pelvic floor exercises. When asked why not, she replied,

'Don't know, mainly because the way it was given to me, a leaflet, just a few words, no diagrams just written so I didn't bother reading it again. If it was explained a little bit more rather than just having a form, may have done them'.

The rest of the women stopped doing pelvic floor exercises soon after the birth of their baby, usually within six weeks or so. Similar to women in the first interviews, nine women spoke of the difficulty they had remembering to do pelvic floor exercises. This was usually given as the reason why the women did not practise them often, or had stopped doing them altogether.

'Hardly ever remember. I think that's down to me. I knew about them and should do them....I remember when it's mentioned, when I go to the loo but just do forget'.

However, five of the women did state that they felt they had benefited from doing pelvic floor exercises and thus started to practise them again whenever the condition became worse.

8.2.3 The Effects Of Stress Incontinence

All of the women were asked about the affects of stress incontinence on their lives. Similar to those in first interview, the answers given varied. Some women were greatly affected, both in terms of practical and psychological effects, whilst for others, it was to a considerable lesser degree.

'have to go and change underwear - laugh, cough, sneeze, every single time. I had no control if I laughed and when I was sick.....feel like I've enough to worry about. Felt like if I'd done something earlier then I wouldn't have to have this extra hassle while bringing up my baby - infuriating. Complete inconvenience!. Thing that makes me most angry is that I've had to get use to it. It shouldn't be like that'.

'I only get it occasionally, if I sneeze, but not everytime. It starts if I stop doing the exercises. no, it has no effect on my day to day activities. no, it doesn't worry me at all because I know I can put it right. If I hadn't done any exercises then it would be a bigger problem'.

Changes Over Time

Just one woman felt that her condition had become worse in the previous nine months, whilst seven thought that it had improved since then. The rest of the women felt their condition had remained the same with respect to severity. However, some felt that whilst the condition had remained the same, the effect it had on them had altered. Two of these women felt that it had become less of a problem because

'I'm probably used to it'

'I'm used to the idea that nothing serious is going on'.

In contrast, three women became more concerned because their condition had not got any better. One of these women was particularly worried that it would become worse as she got older. Two women felt that their perceptions had remained unchanged.

Daily Life

Although not specifically asked, a number of activities were mentioned by the women as provoking their stress incontinence. The range of activities mentioned was as follows. Ten of the women said that they leaked when they coughed, sneezed or laughed. One woman said that she leaked during and after sex, whilst another leaked whilst pushing or lifting up the baby's pram. Another women spoke of leaking whilst bending down.

Five of the women appeared to be less concerned about their condition than they otherwise might be, because they felt that doing pelvic floor exercises helped to ease their condition. This appeared to give them confidence that they had some control over the problem.

'it's something I can control'

'no, it doesn't worry me at all because I know I can put it right. If I hadn't done the exercises then it would be a bigger problem'.

Two other women spoke in a similar manner, although they did not specifically refer to pelvic floor exercises. They talked of being able to control or cope with it, or not let it become a problem. Because these women seemed to feel that they were in control of their condition to some extent, their outlook again appeared to be more positive.

'No, I might think about it at time to time but it doesn't worry me'

'No, because I know it can be put right. I know something can be done'

Similar to the women interviewed in the postpartum, some women talked about coping through practical means. This meant wearing sanitary towels or pantyliners, or frequent emptying of the bladder to prevent accidents. Again, for many of these women this was an everyday occurrence, whilst others used protection at specific times such as social occasions, or when they had a cough or cold.

'I always carry a pantyliner - to prevent smell, keep clean and fresh, that's a worry, can people smell you? I always carry a pantyliner and clean underwear and tights to keep so I can change and know you're clean'.

Contrary to the earlier interviews only two of the women talked about being restricted by the condition. These women spoke of not being able to go jogging, do aerobics or other physical activities. Five women, who were specifically asked if they were restricted in any way by their condition, replied that it did not stop them doing anything.

Contextualising The Condition

Similar to the first interviews just one woman used the term 'stress incontinence' during the course of the follow up interviews. Again the women spoke of their conditions as 'it' or more occasionally 'leakage'.

At one year after the birth, the women did not tend to talk about their condition in terms of pregnancy or childbirth, even though it may have started in connection with this, or became worse during this time. Just one woman spoke of it in this context.

Five of the women spoke of being concerned that other people might find out that they suffered from the condition as the condition was thought to be something of a taboo. These women were embarrassed that they had the condition and were concerned that other people would find out about it. The need for secrecy seemed to be one of the major concerns that they faced in connection with their condition. Whilst some women were able to talk about it, this was usually to other women who had had children, or someone that they knew that had had the condition. In these cases they were sure their confidante could understand and sympathise.

'embarrassing both 'cause other people might get to find out and also 'cause you leak. At work now I can laugh about it because we all have children but you don't want other people to know'.

Like some of the women in the first interviews, two of these women found it particularly difficult when their condition was the source of humour.

'Their dad just thought it was funny so that made it worse. It got to the stage when I couldn't take it anymore. In this case the only person that understood was my mum who suffered herself'.

Unlike the previous interviews just one woman spoke of feeling somewhat to blame for the problem because she had not done her pelvic floor exercises.

'You think it's your own fault 'cause you're not doing the exercises so you blame yourself'.

Contradictions Made During The Interviews

There was some difficulty understanding the meaning of what incontinence meant for some of the women. This was because a number of them made statements that appeared to contradict with other things that had been said by them during the course of their interview. It has already been stated that some women reported that their condition was not bad enough to merit seeking help or advice, yet later in the interview they described the problems it caused. Contradictions were also evident in the narratives on how the condition affected these women. A pattern occurred whereby some of the women dismissed the problem to some extent as not being too important when asked directly

about it, yet elsewhere in the interview spoke in ways to suggest that it was. Examples include the following:

'No, not been praying on my mind at all. Worst was the lack of control, however minimal and being anxious that it doesn't get any worse. I keep thinking I must do something so that it doesn't get any worse'.

and *'Has been a problem, now and in the past.....No, not really been a problem because I'm used to the idea that nothing serious is going on'.*

Following this statement, an attempt was made to clarify the situation by further questioning. This led to the following comments being made, which again appeared to contradict each other.

No, not really bothered by it, just an occasional embarrassment or discomfort.....Worry about others finding out. Shouldn't be happening to me. I feel uncomfortable at times, can spoil a day out because of it'.

Another example was the comment made by another interviewee that

'No, not bothered me at all, generally just laugh about it but not been a problem'.

In this case this statement was immediately followed by

'It (having stress incontinence) really annoys me!'

Feelings and Emotions

Twelve of the fifteen women either spoke directly about their condition being a problem, or described it as such.

'when I go out and sneeze, that's what worries me. I think that not knowing that it's happening and other people - the embarrassment'

'worst was the lack of control however minimal and being anxious that it doesn't get any worse'.

In terms of the psychological effects, just four women admitted that it worried, or had worried them, whilst another four women spoke of being 'aware' of it. The rest of the women gave little or no indication that it affected them in either of these ways. Compared with the women in the first interviews they appeared, on the whole, to be affected to a lesser extent psychologically. This may indeed be the case, possibly because they have become used to the condition, or accepted it, or alternatively their condition may be less severe.

Similar to the earlier interviews, one of the main issues emerging from the follow up interviews concerned the embarrassment which was associated with having the condition. Nine of the women talked about this during the course of their interview. Like the women in the first interviews, they spoke of both the embarrassment in discussing the condition with a health professional, and also of being embarrassed by having the condition itself and other people finding out.

'it's an embarrassing problem. I can't do a lot of things, jogging, step aerobics, it gets embarrassing so you can't go. Embarrassing both 'cause other people might get to find out and also 'cause you leak'.

'Yes, I was worried quite a lot, more the embarrassment I think.....I didn't like going out at night, I'd put sanitary towel on and take spare underwear with me so it was a problem because I'd feel quite embarrassed. Just going out and worrying about anything happening. Bit of both - embarrassment and other people (knowing) she's wet herself sort of thing'.

8.3 Summary

8.3.1 The Information And Advice

Despite the high prevalence of the condition, information on the condition was not made available by health professionals to the women generally. For some women, the symptoms therefore came as a shock. Others who were aware of the condition seemed better equipped to cope with it. For this reason women requested that information be provided. Even at one year follow up this was still on the agenda of many of the women and reflected the importance of this issue. Opinion varied as to how much information was required. Some women wanted to know as much as possible, whereas others just wanted the bare minimum.

A minority of women spoke of the condition as a stressor that stress incontinence could occur during sexual activity. Although few women in the study admitted that this was a problem for them, those that did appeared to be particularly concerned about it. However,

because the present study followed the direction of conversation initiated by the women, it was not possible to discover the full extent of the problem within the current sample.

8.3.2 The Reluctance To Seek Help

Women were reluctant to seek help for their condition during pregnancy, following delivery, or even in the long term. Just seven out of the forty two women interviewed at eight weeks postpartum, had received any help for their condition and three of the fifteen women interviewed at one year follow up. The reasons that women did not seek help were as follows: A number of women reported that they did not need help for the condition either because it was not causing a problem, or because they knew that pelvic floor exercises could help so they did not need further assistance. However, other women appeared to want help but did not ask for it. In addition, some women, whilst stating that they did not want or need help, described during the course of the interview a situation which suggested the opposite. In a number of cases women admitted they had not sought help because they were uncomfortable mentioning the problem to a health professional, although some women felt that they would have admitted to needing help had a health professional asked them first. The difficulty in talking about the condition stemmed from the fact it was felt to be an embarrassing condition and the women were equally embarrassed talking about it. Other reasons the women did not seek help mostly related to their dissatisfaction with health professionals; the women did not know who to approach, they felt the health professionals focused upon the baby to the exclusion of their own health needs, and in some cases were dissatisfied with the service generally provided by the individual. Another factor which caused further reluctance to seek help was that despite describing a distressing and debilitating condition, the women anticipated a poor response from their GP, who, they believed, would feel it was wasting valuable time. At one year follow up the pattern was similar, although the women also felt by this

stage that they had lost contact with the health professionals, this added another barrier to their seeking help.

8.3.3 The Instruction On Pelvic Floor Exercises

The instruction on pelvic floor exercises appeared to be provided on an ad hoc basis rather than planned. This was apparent both across, and within the different professions providing antenatal and postnatal care. As a result, the instruction women received was inconsistent in terms of the source, content and timing. Whilst some women received appropriate and detailed instruction, others had little, or none at all. Women who only attended services for routine appointments were less likely to have received information in comparison to those who attended antenatal or parentcraft classes for example. These women may also be less likely to seek out information from alternative or additional sources. One important issue that emerged was that some of the women were unaware that pelvic floor exercises could help alleviate, or possibly prevent, stress incontinence. Many women were particularly critical of the leaflet which was left for them during their stay in hospital. It was felt to be particularly inappropriate in terms of both the method and timing.

Most women made suggestions regarding the need for improvement of the services.. Many of the suggestions were repeated, showing clear implications of the way forward. The suggestions made were as follows:

- The instruction needs to be provided verbally with an opportunity to ask questions and should be supported by a written format.
- The information should be given during the antenatal period and possibly repeated or a reminder issued in the postpartum when the women have returned from the hospital and settled into a routine.

- Women should be given the precise reasons as to why they should practise pelvic floor exercises and the possible consequences if they don't.
- The importance of doing them should be stressed.
- Reminders need to be issued over again to help reinforce this message.
- Women should also be given the opportunity to have someone check they were performing the exercises correctly.

8.3.4 Performing Pelvic Floor Exercises

The frequency in which women practised pelvic floor exercises ranged from never to several times everyday. Whilst some women stuck to a regular routine and practised them daily, more commonly an inconsistent pattern emerged. This was mostly dependent upon the women remembering to do them. Fewer women practised them in the antenatal period than in the postpartum. This may have resulted from the lack of information provided at this point in time. At one year follow up, none of the women interviewed practised pelvic floor exercises with any regularity, despite having a long term problem with stress incontinence. Most had stopped the exercises within a few weeks of giving birth, although some returned to the exercises whenever the condition worsened.

Women were motivated into practising them first and foremost to relieve the condition itself. Also; to prevent incontinence occurring in the future, because they had been told to do them and, because they knew others who suffered from the condition. The main reason that women did not do them on a regular basis, if at all, was that they had trouble remembering.

Some women reported that they did notice an improvement in their condition after practising the exercises, consequently when their condition worsened they practised

regularly until it improved. This enabled the women to feel they had some control over the problem and helped them to view the condition in a more positive light.

There was some degree of self blame attached to the condition. This occurred either because the women had not sought help or they had not practised pelvic floor exercises consistently enough.

8.3.5 The Effects Of Stress Incontinence

Whilst there were many recurring themes throughout the interviews it became apparent that the condition affected women to differing degrees. Some were affected to a great extent both physically and psychologically by the condition, whilst others appeared little troubled by it, if at all. Although the interviews were unstructured, a pattern emerged whereby the women began by talking about the physical effects of the condition, i.e. what activities made them leak and what they did to prevent or ameliorate it. Following this, some reference was usually made with regard to how they saw the condition within a wider context of life. Lastly, and sometimes only after prompting, did the women speak of how the condition affected them psychologically. In some cases this seemed to contradict what had been said earlier in the narratives.

The women spoke of leakage on coughing, laughing, sneezing and running. Other activities less commonly associated with the condition included vomiting, bending down, swimming, pushing a pram and whilst sleeping. A couple of women spoke of leaking during sexual activity. For this reason many wore pantyliners or sanitary towels everyday or just on occasions when they were expecting problems i.e., when they had a cough or cold. For some women this meant always having to be prepared.

One of the greatest effects of the condition was that of restricting activities. At three months many women spoke of being unable to do such everyday things as exercise, running for a bus, playing with their children. Social activities were also restricted. This loss of freedom caused many of the women distress. By twelve months the women appeared, on the whole, to feel less restricted either physically or psychologically.

How the women viewed the condition within a wider context appeared to have a bearing on the level of distress it caused them. To some extent this appeared to be related to the personality of the women and their general outlook. Some women accepted that they had the condition and incorporated it as part of their lives, others could not accept it and consequently worried about it. The reaction or anticipated reaction of others affected the women's outlook. Many women needed to keep the condition a secret from others, sometimes this even included their partners. A great psychological strain was placed on these women. Whilst their greatest fear was for others to find out that they had the condition, the consequences may not have been so great had they done so. Some women who felt able to talk about their condition with family or friends spoke of how they were good sources of support and information. In a couple of instances the subject was treated with humour which made the women concerned feel that their condition was being trivialised.

Some of the women appeared to have distanced themselves from the condition. This was evident through two mechanisms. First, stress incontinence was spoken of in rather abstract terms, i.e. the condition was never addressed as incontinence but usually referred to as 'it'. Secondly, some women denied that the condition was causing a problem when asked directly, and thus they did not require help. Yet described throughout their narratives was a situation in which they were troubled both physically and psychologically.

Two psychological effects were evident throughout the narratives. These were embarrassment and worry. The nature of the condition caused many women to be embarrassed by it and they were also embarrassed talking about it. Consequently, this led to the need for secrecy and the fear that other people would discover that they suffered from it. There were a number of reasons that the women worried about having stress incontinence. As already stated the women worried that other people would find out that they had the condition. This was not just confined to specific occasions, for example during certain activities which triggered the condition, but was a constant thought that the women carried with them all the time. Another common fear was that the condition would not get better or would become worse in the future. Although not all women were worried by the condition, a number revealed that they were constantly aware of it. As a result the condition was very distressing to women not just because of the physical but also the psychological effects it had on them. At one year follow up however, fewer women appeared to be worried by the condition, possibly because they had become used to it or had developed adequate coping mechanisms, although many were still embarrassed by it. To conclude, by twelve months postpartum the effects had lessened to some extent for many women, although a small number were still greatly troubled physically and psychologically by the condition.

Chapter 9

Discussion

In this chapter results from 3 studies are discussed in relation to other findings. Limitations are outlined, conclusions drawn and implications for future research and clinical practice are presented

9.1 The Prevalence Of Stress Incontinence

9.1.1 Introduction

The following section reports on the prevalence of stress incontinence found in the present study. The severity of the condition is reported and possible risk factors are examined.

9.1.2 Limitations Of The Data

Information on the prevalence and severity of symptoms was gathered by means of three questionnaires administered at thirty six weeks of pregnancy, eight weeks postpartum and one year following delivery. Data on the variables investigated as possible risk factors were taken from the medical records of the participants. Limitations of the data were fourfold: a) the participation rate b) the response rate c) the timing in relation to when the variables were measured and d) the accuracy by which the variables were reported. These are as follows: a) Whilst a very high proportion of women from hospital A agreed to take part in the study, the proportion was lower from hospital B. This may have been due to a number of reasons. At hospital A the women were introduced by the clinic staff and were then invited to take part. At hospital B the women were approached directly without any introduction by hospital staff. This may have influenced the womens decision as to whether to take part. Hospital B, whilst taking women from the surrounding catchment

area also had specialist clinics. It is possible that some of the women approached declined to take part as they were not undergoing a routine pregnancy, or anticipating a routine birth. As no information was available on those women who refused to participate it is possible that they differed from those who agreed to take part. The subjective opinion of the researcher was that they appeared not to be noticeably different in terms of age or ethnicity. In addition, the proportions of women undergoing the different methods of delivery was similar in the study population to all of the women giving birth in the hospital over a one year period. As method of delivery was one of the main risk factors for stress incontinence it is possible that the effect of non participation (and also non response) was not too limiting. b) The response rate lessened with each successive questionnaire. The first questionnaire achieved a response of 78%, the second 64% and the follow up questionnaire 58%. Because of this, the reported prevalence rate may have been biased in either direction, dependent upon whether those with or without symptoms chose to respond. As a result, a range for each of the responses has been calculated within which the 'true' prevalence rate would be expected. The range during pregnancy was between 46 - 68 percent which is at the higher end of the range reported in other studies, ie 23% - 67% (Iosif 1981, Francis 1960). Following delivery the range in the present study was 20 - 56%. Again, this range is high compared to previous studies who reported stress incontinence to affect between 6% (Dimpfl et al 1992) and 29% of women (Francis 1960).

It is also thought that the response rate may have been biased in favour of Caucasian women. Although recruited to the study, few women of non Caucasian backgrounds returned a completed questionnaire. Whilst the present study found a lower prevalence of stress incontinence in non caucasian women this may have reflected a response bias or alternatively result from an actual difference in prevalence. The effect of non response has only been investigated in one other study (Wilson *et al* 1996). A comparison between

responders and non-responders led the authors to conclude that the prevalence rate would not change if non-responders had responded. In the present study permission was not given by the ethics committees to collect data from the medical records of non-responders, so a similar analysis could not be undertaken. However, as the present study was similar to Wilson *et al*'s study (1996), both in terms of methods and outcome, and if their conclusion is correct, it is likely that the true prevalence would also not be greatly affected by non response. c) With respect to possible risk factors for stress incontinence, some of the variables may have been measured at an inappropriate time. For example, cigarette smoking was recorded at the time of booking at around fifteen weeks of pregnancy. Exercise was measured prior to pregnancy. d) Another limitation of the data concerned the accuracy with which some of the variables were measured. Blood loss, taken from the medical records, has to be estimated and therefore reflected the accuracy of the individual who is recording the data. The length of labour may be recorded inaccurately if either the onset of labour, or the transition between the two stages was not recognised and noted with precision. The factors are discussed in more detail within the relevant section.

9.1.3 The Findings

The present study has shown that the symptoms of stress incontinence are common, affecting 59% of all women during pregnancy. This confirmed previous work by Dimpfl *et al* (1992) and Francis (1965). However, other studies reported a much lower prevalence of stress incontinence. Josif (1981) reported a rate of 23%, Viktrup *et al* (1992) 32% and Stanton *et al* (1980) 39% for nulliparous women and 42% for multiparous women. It has previously been stated that differences in the methods may have had a considerable effect upon reported prevalence rates. (See Table 2.1)

Seven hundred and seventeen women responded to questionnaire 1, giving a response rate of 78%. Of these 59% reported stress incontinence. The prevalence was recalculated first by making an assumption that all non responders were continent. This would give a prevalence of 46%. Alternatively, if all non responders were assumed to be stress incontinent, the prevalence would be 68%. A conclusion may be drawn from this that the true prevalence of stress incontinence found in the present study, lay somewhere in the range of 46 - 68%. The sample in the present study varied with respect to the severity of their symptoms. Whilst half of the sample reported episodes of incontinence occurring once per week or less during pregnancy, the remainder had episodes which occurred several times per week or more. Ten percent of all women (or 17% of the incontinent women) reported daily episodes or more, during their pregnancy. Viktrup *et al* (1992) reported a finding of 6% with daily incontinent.

Following delivery, stress incontinence was reported by 31% of the sample. This finding is similar to that reported in the studies by Wilson *et al* (1996), MacArthur *et al* (1993) and Francis (1960). The prevalence reported in these studies was 24%, 20 - 28%, and 29% respectively. The prevalence found in the present study was high compared with findings from the studies by Dimpfl *et al* (1992), Viktrup *et al* (1992) and Stanton *et al* (1980). Again, much of the variation may have been due to the different methods used by the studies (see table 2.1 for details). Following delivery 2% of all women in the present study (or 8% of the incontinent women) reported daily incontinence. This figure is comparable to the 1% prevalence reported in Viktrup *et al*'s study (1992) and the 3.3% reported by Wilson *et al* (1996). (The latter included all women irrespective of the type of incontinence symptoms). A response rate of 64% was achieved for questionnaire 2. If the non responders were all assumed to be continent, a prevalence of 20% would have been found. Alternatively, if non responders were all assumed to be incontinent, the prevalence

would have been 56%. The true prevalence of symptoms of stress incontinence after birth therefore lies somewhere in the range of 20 to 56%.

One quarter (26%) of women with symptoms of stress incontinence at 8 weeks postpartum, reported that their symptoms first began following delivery. However, a proportion of these women had previously reported that their symptoms first started during pregnancy. It is possible that whilst these women had symptoms during pregnancy their condition changed following delivery, possibly becoming much worse in terms of frequency and amount of leakage. As a result the women may have assessed the condition differently over time. It is also possible that discrepancies occurred due to inaccurate memory recall. Whilst the study was designed to follow up the women through pregnancy and following delivery, each questionnaire related to events occurring in the previous weeks / months rather than the time at which the questionnaire was received. It is generally acknowledged that retrospective studies may not be as reliable as contemporary studies. Findings from other studies (Viktrup *et al* 1992, Wilson *et al* 1996) also reported that symptoms first began, in some cases, following delivery. However, Francis (1960) stated that stress incontinence rarely, if ever, began for the first time following delivery. Whilst Stanton *et al* (1990) also supported Francis' (1960) conclusion, no evidence was provided to substantiate this claim. It would appear from this that parturition itself may be implicated as a causative factor of stress incontinence.

One hundred and six out of the one hundred and eighty women with symptoms of stress incontinence at eight weeks postpartum responded to the follow up questionnaire at one year. This gave a response rate of 58%. The true prevalence was not calculated as this would have involved making assumptions based on a range which itself was calculated using assumptions. Sixty five percent reported that their symptoms were still present.

Although some of the women experienced occasional symptoms, one third reported that leakage occurred daily or several times a week. Thus for a high proportion of women, their symptoms were long term and sometimes severe.

Sixty three percent of the women whose symptoms had stopped, reported that this occurred during the first three months following delivery. From this, it would appear that if the symptoms have not ceased within the first three months, there is a strong possibility that the condition will remain in the long term. For many of the women however, the condition appears to be temporary, with continence being restored when reinnervation occurs, and the hormonal changes which occurred during pregnancy are reversed.

The high prevalence reported in the present study both during pregnancy and following delivery is thought to reflect the comprehensive methods adopted in the present study. The questionnaire used to ascertain the prevalence of the condition incorporated a number of activities associated with leakage so that women could identify with this, irrespective of their own precipitating factors. In addition, the questionnaire was short and the language used was simple, making it easy to understand and user friendly. As a questionnaire was used in preference to an interview it was thought this also increased the likelihood of women admitting to having the problem. Another factor related to the inclusion of all women, irrespective of their continence status prior to entering the study and also their parity. It is thought this provided a true reflection of the extent of the condition in the population of childbearing women

The present study provides further evidence of the relationship between parity and stress incontinence, with increasing parity a risk factor for stress incontinence. Stanton *et al* (1980) and Francis (1965) also reported a higher incidence of stress incontinence in

multiparous women compared with nulliparous women. Iosif (1981) found a significant difference in the prevalence of stress incontinence in women of para 1 compared with women of para 2. Wilson *et al* (1996) found increasing parity was a risk factor but reported that the risk increased after 4 children. Whilst the present study did not replicate the finding, this may have been due to the small number of women in the study (16) of parity five or higher.

There were contradictory findings on the relationship between mode of delivery and incontinence. The present study found no difference in the prevalence of stress incontinence following a normal vaginal delivery compared to an instrumental delivery. This confirmed Wilson *et al*'s (1996) results. MacArthur *et al* (1993) also reported that forceps delivery was not significantly associated with a higher level of stress incontinence. However when the type of forceps was separated into non rotational and rotational, the latter was found to have a weak association with stress incontinence. Dimpfl *et al* (1992) reported a trend showing that women having an operative vaginal delivery had a higher prevalence of stress incontinence. Overall, strong conclusions cannot be drawn with respect to operative deliveries. Some of the differences may result from the efficiency of the operator.

The present study has confirmed the protective effect of caesarean section (Wilson *et al* 1996, Viktrup *et al* 1992 and MacArthur *et al* 1993). Caesarean section was associated with a significantly lower prevalence of stress incontinence than vaginal delivery. As some women who had had a caesarean section reported symptoms of stress incontinence, it appears the protective effect is not absolute. This confirmed findings from previous studies (Wilson *et al* 1996, Viktrup *et al* 1992). In agreement with Wilson *et al* (1996), the

present study found no significant difference between the effects of elective caesarean section and those of an emergency caesarean section.

Multivariate analysis showed that parity and birthweight were predictors (albeit poor) for stress incontinence in women having had a spontaneous or instrumental delivery. However, these variables did not predict stress incontinence amongst women who had had a caesarean section.

Neurophysiological studies have reported differences to occur with age in the pelvic floor muscles of nulliparous women. It would appear from this that age itself has a direct bearing on the degree of pelvic floor denervation. Findings from the present study were consistent with this. Although not statistically significant, a trend was apparent showing that women with stress incontinence were older, on average, than asymptomatic women. Wilson *et al* (1996) found no association between the two variables. It is possible that whilst changes in the pelvic floor occur with age, these are not advanced enough for symptoms to occur in women of childbearing age. The trend evident in the present study may also have reflected the influence of parity. Women of parity one were, on average, younger than women of parity two or higher. Multivariate analysis appeared to confirm this hypothesis, as age was rejected from the predictive model for stress incontinence when parity was included.

Evidence from the few studies undertaken to date have indicated that there are differences in the prevalence of stress incontinence according to ethnicity. Burgio *et al* (1996) reported a higher prevalence of stress incontinence amongst white women in the early postpartum and at six weeks follow up, compared to black women. Bump (1993) also found a higher prevalence of stress incontinence amongst white women. However, the

difference was reported in a population presenting for urogynecologic evaluations and this may have reflected differences amongst women with respect to seeking help. The present study found an association between race and stress incontinence whereby a higher prevalence of symptoms was reported amongst Caucasian women in contrast to non Caucasian women (33% compared to 7% following delivery). Differences in the prevalence rates may have resulted from a number of factors. Caucasian women delivered babies who were heavier on average and had a larger head circumference in comparison to non Caucasian women. As heavier babies and a large head circumference were also associated with an increased risk of stress incontinence, it is possible these factors may explain some, or all, of the difference in the prevalence of stress incontinence amongst Caucasian and non Caucasian women. Parity was also found to be significantly associated with ethnicity. Caucasian women were of lower order parity in comparison to non Caucasian women. However, as low parity was associated with a lower prevalence of stress incontinence, the relationship appears to be in the opposite direction and therefore does not explain the relationship between ethnicity and stress incontinence. Whilst findings from the present study reflected those of Burgio *et al* (1996), it is possible that there are limitations. The sample of women participating in the present study consisted mainly of Caucasian women. The low participation rate amongst women of different ethnic origins resulted in these being combined into one category for the purpose of analysis. It is possible that noncaucasian women suffering from stress incontinence chose not to return the questionnaire. As demographic details were not taken from the notes of those women who did not respond to the questionnaire, it was not possible to ascertain whether this was the case.

Previous studies have reported contradictory findings with respect to the length of labour and the development of stress incontinence. Findings from the present study were

equivocal. Three stages of labour were considered: a) length of first stage b) length of second stage and c) total length of labour. With respect to the first stage, a trend was evident although it did not reach statistical significance. This showed that women with stress incontinence, on average, underwent a shorter first stage of labour in comparison to asymptomatic women ($p = .052$). This may be due to the influence of parity. Women of higher parity tended to have a shorter length of labour compared to nulliparous women. Parity itself is a risk factor for stress incontinence. Studies looking at the second stage of labour reported that a prolonged second stage resulted in a greater degree of nerve damage (Allen *et al* 1990, Snooks *et al* 1984b), or a higher prevalence of stress incontinence (Viktrup *et al* 1993, MacArthur *et al* 1993) However, the present study, like that of Tetzschner *et al* (1997), found no relationship between the second stage of labour and stress incontinence or PNTML respectively. The total length of labour has been investigated in a number of studies. Rockner (1990), Iosif (1981), Dimpfl *et al* (1992) found no association between total length of labour and stress incontinence. Skoner *et al* (1994) reported that a longer labour was associated with increasing prevalence of stress incontinence. In contrast, the present study found that a longer labour was associated with a lower prevalence of stress incontinence. There were a number of confounding factors. Parity was also associated with length of labour. Women of parity one experienced a longer labour in comparison to women of high order births. Multivariate analysis undertaken on the sample of women having had a spontaneous or instrumental delivery showed that the total length of labour was not a predictor for stress incontinence. It is therefore likely the univariate association existed by virtue of its relationship with parity. Another possible explanation for the conflicting results between the different studies could be related to inaccuracy in measuring the stages of labour, or the use of different management techniques. With respect to measuring the length of labour, the women themselves may not have recognised the onset of labour. The transition between first and

second stage (traditionally defined as beginning with complete cervical dilation) requires examination at the time for total accuracy. However, other definitions regarding the onset of second stage may have been adopted according to Roberts and Wooley (1996), which again may have affected measurement. With respect to management, hospital policy may require that women undergo medical intervention if their labour does not progress within a specified time period. The length of labour may therefore have differed between studies according to policy or practice relating to whether and when women are encouraged to push or left to progress at their own pace. Again, different practices may have been adopted in relation to the use of oxytocics to augment labour.

To date, previous studies examining the relationship between birthweight and stress incontinence have reported conflicting findings. The studies by Iosif (1981), Rockner (1990), Dimpfl *et al* (1992) and Wilson *et al* (1996) found no association between the two variables. Other studies (Skoner *et al* 1994, Viktrup *et al* 1993, MacArthur *et al* 1993) reported a trend which was confirmed in the present study. A heavier birthweight was associated with increased prevalence of stress incontinence. It is believed that increased pressure on the pelvic floor caused by the additional weight, damages the muscles and nerves. It is also possible that the association occurs, or is strengthened by the influence of a third variable. Other variables found to be associated with birthweight included ethnicity, method of delivery and head circumference. With respect to ethnicity, the present study found that Caucasian women gave birth on average, to heavier babies in comparison to non Caucasian women. The association between method of delivery and birthweight found that women who gave birth spontaneously, or had an instrumental delivery, were more likely to deliver heavier babies in comparison to women who had a caesarean section. However, multivariate analysis using both discriminant function analysis and logistic regression showed that birthweight was associated with the

development of stress incontinence, irrespective of the association with method of delivery. Head circumference is closely related to birthweight and it is likely the two both influenced the degree of damage to the pelvic floor during parturition by means of increased pressure or stretching of the muscles and ligaments. However, as other studies (Allen *et al* 1990, Wilson *et al* 1996) found no association between head circumference and stress incontinence, it is likely that this exerted the least influence. It may only have shown an association by virtue of its relationship to birthweight. This may also explain the finding in the present study which showed a significant association between head circumference and stress incontinence. Women with symptoms of stress incontinence gave birth to babies with a larger head circumference on average, in comparison to asymptomatic women.

The present study found no association between perineal damage, including episiotomy, and stress incontinence. This was in line with the majority of previous studies.

The relationship between pain relief and stress incontinence has not been investigated previously. The present study found that two forms of pain relief were significantly associated with the development of stress incontinence following delivery. These were entonox and spinal analgesia. Entonox was associated with a higher prevalence of stress incontinence whilst spinal analgesia was associated with a lower prevalence. Two other forms of pain relief also showed a trend, although neither reached statistical significance. These were epidural ($p = 0.061$) and general anaesthetic ($p = 0.057$). It is likely that pain relief showed a significant correlation to stress incontinence by virtue of its particular use in specific types of delivery. Entonox alone is predominantly used in spontaneous deliveries, particularly of multiparous women, which in turn are associated with a higher prevalence of stress incontinence. Spinal anaesthesia is commonly used in caesarean

sections, which appear to protect from stress incontinence. Neither form of pain relief were found to be statistically significant when the sample included only women who did not have a caesarean delivery.

Although not investigated in other studies, the present study found a significant association between blood loss and stress incontinence. Symptomatic women lost, on average, less blood in comparison to asymptomatic women. It was hypothesised that the association resulted from the relationship between blood loss and method of delivery. Babies born by vaginal delivery are more likely to have gone to full term and therefore are possibly heavier in comparison to those delivered by caesarean section. A caesarean section may be performed when there are problems often occurring with babies who are preterm and small for dates. Multivariate analysis would appear to confirm this hypothesis as blood loss was rejected as a predictor for stress incontinence when method of delivery was included in the model. Parity may also be a confounding factor. Women who are of para one lose, on average, a greater amount of blood compared to women of para two or higher.

An association between the efficacy of the perineal muscles and the extent to which women exercised one year after delivery, was reported in the study by Gordon and Logue (1985). Any form of exercise was found to improve perineal muscle function. In contrast, the present study found no association between the frequency of exercise taken prior to pregnancy and stress incontinence. However, the lack of association may have resulted from a limitation in the present study. On reflection both the timing at which the exercise was considered, and the question used to assess the frequency of exercise were possibly inadequate. The study looked at the frequency of exercise taken prior to pregnancy as it was thought women may change their usual exercising habits considerably during

pregnancy. However, between conception and thirty six weeks when the questionnaire was administered, women undergo considerable physiological changes which may affect the prevalence of stress incontinence. In addition, the questionnaire was designed to be short in length, quick and easy to answer. It was decided to devote only a single question to this topic. If the findings indicated any relationship this could be followed up with more detailed research. The women were therefore asked about the number of days per week they exercised for a period of twenty minutes or more. As a result, women who undertook vigorous exercise for long periods at a time were categorised with women who did twenty minutes of gentle exercise, yet differences in muscle tone may have been evident between these two groups.

Although previous studies have reported a relationship between smoking and stress incontinence (Bump and McClish 1992, Tampakoudis *et al* 1995), none was found in the present study. On reflection, the tool used to measure cigarette consumption may have been limited in two ways. Information on cigarette consumption was taken from the medical records. It is possible that women who smoked did not disclose the full extent of their smoking habits to the midwife who took these details at booking clinic. As consumption was measured at this point in time i.e. around fifteen weeks of pregnancy, cigarette consumption may have altered during pregnancy and in the eight weeks following delivery when the prevalence of stress incontinence was measured. With hindsight, the information should have been gathered using the questionnaire so that cigarette consumption at thirty six weeks of pregnancy, and at eight week postpartum could also have been measured.

Although not investigated previously, other variables were considered as possible risk factors for stress incontinence. These were: methods of induction and augmentation,

method of feeding and the number of babies delivered. The hypothesised mechanisms by which they could be associated with the development of stress incontinence were discussed previously in the literature review. None of these variables were however, found to be associated with stress incontinence. It must be noted that the number of women in the present study who gave birth to twins was very low, i.e. five in total. It would therefore not be appropriate to draw conclusions in this particular case.

9.1.4 Summary

The present study showed that the prevalence of symptoms of stress incontinence amongst women attending antenatal and postnatal services is high. Two thirds of women reported symptoms during pregnancy, whilst one third reported symptoms following delivery. For the majority of women whose symptoms did not resolve in the first three months after delivery, the symptoms remained a long term problem. Whilst findings from the present study agreed with some previous studies, it also contradicted findings from others. The differences stemmed largely from methodological differences between the studies.

The study has confirmed the association between parity and stress incontinence, also the protective effect of caesarean section, although the symptoms may occur in a minority of cases. Previous studies have not been in agreement with respect to the association with a number of other risk factors. The present study provided further evidence, although this was not conclusive. Whilst a number of variables were significantly associated with the development of stress incontinence these could not be used to predict whether an individual will develop the condition. Continence is maintained through a number of different mechanisms, the internal and external urethral sphincter, the urethrovesical angle of the bladder neck and urethra, and the constant tone and reflex action of the levator ani.

Whether an individual develops stress incontinence depends upon the extent of the damage to the muscles, nerves, fascia and ligaments and the ability of the different elements of the continence mechanism to compensate for this. Whilst each of the variables associated with stress incontinence may increase the likelihood of damage to the pelvic floor they would not necessarily cause stress incontinence to occur.

9.1.5 Recommendations

For Clinical Practice

- Health professionals and women alike should be made aware of the high risk of developing symptoms of stress incontinence during pregnancy and / or following delivery.
- Women who have stress incontinence three months following delivery are at risk from suffering from the condition in the long term and may therefore need further treatment or help. It would be useful to implement a check at this point by the health visitors, to ascertain the continence status of these women and assess their health needs. In terms of practicalities this may be best achieved when the women attend a health visiting clinic for a check up with their child.
- Although a caesarean section appears to protect from stress incontinence, the effect is not absolute. Women who have had a caesarean section should therefore also receive the same information and checks as other women.

For Future Research

- As much of the evidence regarding possible risk factors for stress incontinence is contradictory, further research would be useful. In particular, those factors which could be controlled either by the individual's behaviour, or by clinical practice should be researched in greater depth i.e. cigarette smoking, exercise and length of labour

- Owing to the paucity of information, detailed research should be undertaken into the effects of ethnicity on stress incontinence. Reasons for any differences should also be investigated as this may help to illuminate further the causes and risk factors for stress incontinence. Any study should overcome the limitations of the present study and incorporate large numbers of women from different ethnic backgrounds. Every effort should be made to encourage a high response rate.
- As stress incontinence has been found to develop for the first time either during pregnancy (and continuing after the birth), or following delivery in a small number of women who had had a caesarean section, further research into the possible causes would be of value. This is particularly relevant in light of findings that risk factors for stress incontinence such as parity and birthweight were not found to predict stress incontinence in women who had had a caesarean section.

9.2 The Service Provision

9.2.1 Introduction

The services provided for women who are at risk, or who suffer from stress incontinence during pregnancy or following delivery is largely undocumented. The literature is abundant with references to pelvic floor exercises and as a conservative form of treatment with no side effects, pelvic floor exercises do appear to be particularly suitable for pregnant women and those in their childbearing years. However, little is currently known about the information given to women on pelvic floor exercises at these times.

The following section will first examine the general care available to women with stress incontinence at these times, and make recommendations for improvements as necessary. By focusing on pelvic floor exercises, the next section will consider findings from published studies to assess the efficacy of pelvic floor exercises, and look at what constitutes an

effective programme of exercise. The instruction that the women in the present study received will be compared with this and suggestions made for future improvements, if necessary. The compliance of the women with the exercise programme will then be considered and again, recommendations made for improving compliance rates, if necessary.

The information used in the following discussion was compiled from all three sources i.e., the women's questionnaires, the interviews and the health professionals questionnaire. Although comprising two different points of view, the findings were very similar with a consensus of opinion.

9.2.2 Limitations of the data

Unfortunately the response to the health professional survey was low, with only a 34% response rate. It is possible that this was due to the heavy work schedules of health professionals which allow little time to pursue activities other than routine monitoring and care. However, it is also possible that many health professionals felt that the survey, and possibly the condition itself, was not important or of high priority. Indeed two of the health professionals returning the survey believed that stress incontinence was not a common problem in their sphere of practice. In contrast however, many of the remaining health professionals reported that it was a neglected subject that and improvements in the service were necessary. As a result, the response may have been biased towards those health professionals who felt that the subject was important, and consequently may provide a better service than those who did not.

The women's questionnaire did not request details on the content of instruction as it was intended that the women who were interviewed could supply the information in greater

detail. Unfortunately few women could recall the details. For this reason the information reported here has been compiled from the health professionals only. However, although the survey requested the information, a number of health professionals did not provide details on the instruction that they provided. This may have resulted from inadequate wording on the questionnaire. However, it is also possible that the health professionals failed to provide the information to the women. As two of the women interviewed requested that health professionals should state the frequency of exercises, it appears this may have been the case, at least in some instances. As a result of missing data it was difficult to assess with confidence how well the recommendations made to the women met those suggested in the literature.

Information was not requested from either the women or the health professionals concerning the duration of exercise recommended. With hindsight the information should have been collected as it appeared to be an important factor relating to the efficacy of the exercises (Bo *et al* 1990, Hahn *et al* 1993).

9.2.3 The Services Available To Women With Or Suffering From Stress Incontinence

Although stress incontinence affects many women during pregnancy or following delivery, a number of women reported that they were not provided with any information on the condition. For those women who had no knowledge of stress incontinence the symptoms came as a shock. For this reason many women spoke of the need to be provided with information beforehand. As well as reassurance and pre-empting any shock or worry, this may also help to lessen the taboo associated with the condition, and encourage women to seek help if necessary.

Whilst it could be argued that the needs of the individual suffering from stress incontinence may vary, the survey showed that the usual course of action taken by the different health professionals was not consistent. This varied both between the different professions and between members of the same profession. Although most health professionals reported that they provide instruction in pelvic floor exercises, this was not true in all cases. (The instruction in pelvic floor exercises will be described in more detail later). Other actions taken by health professionals included providing information on causes of the condition, anatomy of the pelvic floor and general exercise, also referral to another health professional. (Physiotherapists provided more specialist treatment). Again, the course of action appeared dependent upon the individual who was providing the care, rather than specific to all professionals or members of the same profession. The patterns of referral were also unclear with no consensus over who the women were referred to for specialist treatment. Again this was the case for members of the same profession.

Whilst 56% of the health professionals were satisfied with the course of action they were able to take, 42% were not. The majority of respondents, i.e. 90%, acknowledged that improvements could be made in the service. Many agreed with the improvements which were suggested in the survey; more time to spend with women, more information and training on the subject, more informative material to hand out to women and increased knowledge with respect to sources of referral. Additional suggestions made by the health professionals themselves covered a wide spectrum of care and included the following areas: organisation of the service, referrals, input from the physiotherapy department and help for those for whom English was not their first language.

9.2.4 Recommendations

For Clinical Practice

- Women should be provided with information on stress incontinence during their pregnancy by midwives.
- The system of care for women with stress incontinence should be reorganised using a multidisciplinary approach.
- Members of each profession who give antenatal and postnatal care should be provided with agreed and clear multidisciplinary protocols and procedures regarding the care for women with stress incontinence.
- The system of referrals for specialist treatment should be overhauled i.e., Knowledge should be made available with respect to what specialist care is available within each Trust and who can provide this service. From this, decisions should be taken and agreement reached amongst the different disciplines regarding referral procedures. Members of each profession should then be provided with clear protocols and procedures on referral practices.
- A number of suggestions have been made within the present survey by health professionals with respect to improving the care. Service providers should consider the merits of these and the feasibility of incorporating any of them into the service.

9.2.5 Pelvic Floor Exercises

Evidence Of Efficacy

According to the literature (Lagro - Jannsen *et al* 1991, Hahn *et al* 1993, Henalla *et al* 1988) pelvic floor exercises are an effective form of conservative treatment for stress incontinence. Because of the numerous mechanisms involved in promoting continence, pelvic floor exercises would not be expected to help all women. However, approximately two thirds to three quarters of women embarking on a course of exercises *may* be expected to be 'cured' or improved, provided that the exercises are carried out correctly. A recent systematic review of randomised clinical trials for the treatment of stress

incontinence confirmed that pelvic floor exercises are an effective form of treatment (Berghmans *et al* 1998). However, the literature also showed that a number of factors can influence the efficacy of the exercise programme. In order for the programme to be effective, the following elements should be incorporated into the instruction:

i) some element of supervision

ii) detailed instruction on how to perform pelvic floor exercises with -

iii) some form of test to ensure that each woman can perform an effective pelvic floor contraction. Vaginal palpation using the P.E.R.F.E.C.T. scheme was recommended by Laycock (1997). The P.E.R.F.E.C.T. scheme allows 'the contractility of the muscles to be evaluated and a patient specific exercise programme planned'. The initials stand for 'Power, Endurance, Repetitions, Fast, Every Contraction Timed'. During pregnancy the perineal body can be palpated, although experience is needed to assess this accurately.

iv) the exercises should be carried out over a period of at least three months in order to achieve a satisfactory degree of improvement. Once attained the exercises should be continued, albeit with less frequency, in order to maintain the benefit

v) both fast and slow contractions should be incorporated into a daily regime of exercise. The literature is unclear as to how many contractions should be performed, although Miller *et al* (1994) stated that this should depend upon the differing abilities of the women. The programme should be started at a level appropriate to each woman and the number of contractions should be built up over a period of time.

vi) the timing of the information should be appropriate. Women in the present study reported that they were more receptive to information given prior to the birth whereas following delivery, they (and the health professionals) focused upon the health and well-being of the child. Also, in order for the exercises to prevent postpartum stress incontinence the information should be provided during pregnancy. (This will be discussed in more detail later in the chapter).

The Instruction The Women Received In The Present Study

Whilst it appears that close supervision during instruction and exercise is important, no single profession was identified as fulfilling that role. A number of individuals from different health professions provided instruction e.g., physiotherapists, hospital midwives, community midwives, health visitors, GP's and practice nurses. However, as not all members of each profession did this, the information was replicated in some cases yet missing in others. The information may have been provided by individuals who felt that it was important, rather than a requirement of their job description. A number of the women interviewed who felt that they had received valuable information, reported that the health professional providing the information had felt it to be particularly important, and in some cases had admitted suffering from the condition themselves. Whilst all the physiotherapists taking part in the health professional survey reported that they provided instruction in pelvic floor exercises, it appeared that they were not in contact with all women who used antenatal or postnatal services. If this had been the case a higher percentage of women would have received the information.

It appeared that the information on pelvic floor exercises was not provided systematically. Just over half of the women (55% of the sample) reported that they received information during the antenatal period. The corresponding figure in the postpartum was 85%. Just over half the sample (51.3%) received information during both. Five percent of women did not receive any information at all. The inconsistency of coverage appeared to stem from the lack of organisation in services. Whilst some women received no information at all, others received it from more than one source.

The instruction was presented by a variety of means, although the majority of women in the present survey received a leaflet outlining the exercises. In many cases they had no other form of instruction. Of the five hundred and seventy two women who responded to both questionnaires, three hundred and fourteen women received the information (if at all) by means of a reminder and / or leaflet only. According to the literature (Laycock et al 1987, Bo *et al* 1987), it is likely that a proportion of these women would have needed more detailed instruction before they could perform an effective pelvic floor contraction. Of the women who received the information verbally, possibly up to one quarter, may also be expected to perform an incorrect pelvic floor contraction. Following instruction, a number of women reported that they were not sure if they were doing the exercises correctly, whilst others requested that a health professional check that they were doing them properly. This would appear to confirm the difficulty reported by Laycock 1987 and Bo *et al* 1987 in teaching pelvic floor exercises, and the necessity of making sure that the women could perform an effective pelvic muscle contraction. Although health professionals did report that they verified their clients were doing them correctly, few did this on a regular basis. This was usually done by checking that their clients could stop and start micturition at will. Laycock (1997) recommended that assessment of the pelvic floor be done by simple vaginal palpation, or palpation of the perineal body during pregnancy.

As stated earlier, information was not collected on the duration of exercise which was recommended by the health professionals. It is therefore not possible to assess how well this met the criteria in the published literature.

There was little agreement between both the different professions, and also members of the same profession with respect to content. This may have resulted from a lack of research findings in relation to an 'optimal' exercise programme, or a lack of clear

guidelines provided to them. Indeed as part of the study the Royal College of Midwives, the Health Visitors Association and the Chartered Society Of Physiotherapists were contacted and asked about the guidelines they recommended to their members on pelvic floor exercises. None of these provided any formal written guidelines (see previous). For whatever reason the women were provided with different sets of instructions and where some women received information from more than once source, sometimes this conflicted. It also became evident that some women were just told or reminded to do exercises without being provided with any details. The few health professionals who provided details in the survey, varied in their recommendations. A small number stated that the programme they recommended would vary according to each woman's ability to contract her pelvic floor muscles. With respect to the details, the period of exercise recommended ranged from two to thirty minutes, and the number of sessions per day from one to twenty. Very few provided details on the number of fast and slow contractions. It is therefore possible that they did not specify this as part of their instruction. Where specified, the number of slow contractions ranged from three to 'as many as possible' and the length of hold from two to thirty seconds. The number of fast contractions ranged from one to thirty five. Some of the recommendations provided by a range of health professionals appeared to be extreme in comparison to others e.g. 8 health professionals recommended spending five minutes or less of exercise per day, whilst another, twenty sessions per day. Six health professionals recommended less than five slow contractions per day and three recommended holding a slow contraction for fifteen seconds or longer. One health professional recommended just one fast contraction per session, in contrast another recommended thirty five fast contractions per session.

The instruction on pelvic floor exercises was provided at various stages during pregnancy or following delivery. This appeared to be dependent upon the professional providing the

information. Fifty five percent of women received information during pregnancy and 86% following delivery. It would appear that nearly half of the sample did not receive any information at what may be the most appropriate time, i.e. the women felt more receptive to information during the antenatal period. This would also allow them to practise the exercises prior to the birth and possibly prevent postpartum stress incontinence.

From the women's point of view, it was judged that the information provided during antenatal or aquanatal class was the best source of information generally. It was provided during the last trimester, the instruction was usually detailed and the women were usually given the opportunity to practise the exercises alongside an instructor who could answer any questions if necessary. Although the quality and timing of the information at these classes appeared to be good on the whole according to those women who received it, they were not accessible or accessed by all women. According to Hancock (1994) less than half of the women who present for antenatal care also attend classes in childbirth preparation and those that do, appear to be unrepresentative of the population as a whole. The study by Nolan (1994) found that irrespective of whether the class was provided by the voluntary sector, or the hospital, the women tended to be older than the national average for childbearing women, and predominantly middle class. Younger mothers were also poorly represented. A recent study by Cliff and Deery (1997) found that young unmarried working class women were particularly poorly represented at antenatal classes. These findings were in agreement with previous studies (O'Brien and Smith 1981, Lumley and Brown 1993). It can therefore be assumed that a large proportion of women, particularly those who are younger and less advantaged, would not receive detailed instruction in pelvic floor exercises. The advice should therefore be given as part of antenatal care visits rather than in separate classes.

In contrast, the women criticised what appeared to be the common practice of having a leaflet left for them during their stay in hospital at the time of delivery. This was thought to be inappropriate both in terms of the timing and also the method. It was felt to be inappropriate to provide such information when they had just given birth. Although reported to be easy to understand, the leaflet did not stress the importance of the exercises, particularly as it was frequently just left without any form of introduction. The practice of leaving the leaflet amongst a pile of other leaflets attracted much criticism. This was felt to be too much information at any one time, consequently priority was given to those such as on cot death, which were deemed to be more important, although much rarer.

In addition to requesting a check to see that the exercises were being performed correctly and having the information provided during the antenatal period, other suggestions were made by the women as to how the instruction could be improved. These included; a) the need to stress the importance of doing the exercises, particularly the consequences of being stress incontinent. b) being given verbal instruction rather than written information, which would also allow questions to be asked. c) provision of written information to serve as a reminder.

The health professionals differed with respect to how they felt the instruction could be improved. Although ideas were suggested individually, a large proportion felt that the following improvements would be useful; more time to spend with the women, additional informative material to provide the women with, increased knowledge and training with respect to the subject and an increased knowledge of sources of information on the subject.

9.2.6 Summary

It would appear that many of the women did not receive the most appropriate instruction in pelvic floor exercise. However, because the instruction varied from woman to woman, some, particularly those who attended antenatal classes, received very good information, although many others did not. Only half of the women received the information during the antenatal period yet many stated that they would prefer it at this time. This would also allow them to practise the exercises during the antenatal period and possibly prevent postpartum stress incontinence occurring. Many women received the information only in the form of a reminder or leaflet, yet studies have shown that a large proportion of women would not be able to perform an effective muscle contraction following this form of instruction. The women themselves felt this to be an inappropriate method of instruction and were often not sure if they were doing the exercises correctly. Some requested that a health professional check to see if they were doing them correctly as it appeared not all health professionals did this. The instruction in pelvic floor exercises varied enormously in content and appeared to be dependent upon the individual who was providing the information.

9.2.7 Compliance

It appeared that although there was some association between receiving instruction and performing the exercises, not all women who received information from health care professionals exercised their pelvic floor muscles. Conversely, some women who were not provided with information from this source did practise them. During the antenatal period some sixty nine women who received information did not practise the exercises. In contrast, one hundred and sixty three women who did not receive information did perform them. In addition, a number of women began to practise pelvic floor exercises very early in their pregnancy, i.e. prior to three months, yet in many cases the health professionals provided the information later on in the pregnancy, usually at antenatal or aquanatal class. It is likely that some of these women were provided with information during a previous pregnancy, whilst others received the information from an alternative source. Indeed a number of the women spoke of how they had wanted to glean as much information as possible about pregnancy and birth and this probably extended to information on pelvic floor exercises. Often family and friends were cited as good sources of information. Whilst there was a high correlation between receiving information and practising the exercises during the postpartum period there were some inconsistencies again. Seventy women who received information during this time did not practise the exercises, whilst forty nine women who did not receive information did perform them. The evidence from this would suggest that the advice from health professionals with respect to pelvic floor exercises was not always adhered to, and that alternative forms of information were accessed during this time.

Whilst a high proportion of women practised pelvic floor exercises i.e. sixty nine percent during pregnancy and eighty two percent following delivery, in many cases these were performed on an irregular basis. Of these, many women reported that they performed the

exercises just occasionally, or once per week, i.e. thirty five percent during pregnancy and twenty eight percent following delivery. It is unlikely that this frequency of exercise would produce much beneficial effect. The irregularity of the exercise may have resulted from the lack of guidance on frequency of exercise. As already stated, many of the health care professionals failed to report in the survey what they recommended, possibly as they did not provide this information to the women. Another factor affecting the regularity of exercise may have been that some of the instruction was inappropriate, particularly if the women could not contract their pelvic muscles, or found it difficult. A number of women stated that the importance of doing the exercise was not stressed, and it is also possible that importance of doing daily exercise was not stressed either.

According to the women, the predominant reasons for not practising pelvic floor exercises was that they forgot to do them. They were also too busy, and when they had a free moment were too tired to contemplate doing them. Some women were unaware that pelvic floor exercises could help prevent or treat stress incontinence. The instruction they had received, if any at all, had failed to make the connection clear. Lastly, they weren't sure if they were doing them correctly. The women were usually motivated to do the exercises because they had a problem with stress incontinence at that time and wanted to ease their condition. Some women did them because they were told to, either by a health professional or by a member of their family or friends. Whilst this was not usually the primary reason for doing them, it did provide further incentive. Another reason for exercising was to prevent problems occurring in the future. Some women worried about being incontinent when they were older, others reported that they knew of someone who had the condition and did not want to end up like that themselves.

The women who practised pelvic floor exercises differed in a number of ways to those who did not do any exercises at all. They were on average, older than the non exercisers and a higher proportion were Caucasian. They were also more likely to adopt health promoting behaviours, i.e. less likely to smoke and more likely to perform general exercise. They were also more likely to breastfeed their child. Other differences were apparent. In terms of the birth itself, exercisers were more likely to have used entonox for pain relief compared to the non exercisers. A greater proportion of exercisers had their labour induced compared to non exercisers. Exercisers gave birth on average, to a heavier baby compared to those who did not do pelvic floor exercise. Because the women who practised pelvic floor exercises also tended to adopt other health promoting behaviours, it is possible that they were more likely to attend antenatal classes which were the best source of information. This may have motivated them into practising pelvic floor exercises, or alternatively because they were interested in healthy behaviour they may have been more likely to seek out the information and practise them.

Factors such as whether or not information was received (irrespective of the source), the quality and timing of the information, having or knowing someone with the condition, and the knowledge that the exercises may alleviate the condition, appeared to be major determinants of whether they performed the exercises, according to the women themselves. The literature suggests that other factors may influence health behaviour. Studies have indicated that people with an internal locus of control are more likely to engage in information search about health maintenance and also preventive behaviours (Strickland 1978). An internal locus of control refers to the belief that events are contingent upon one's own behaviour. An external locus of control refers to the belief that events are dependent upon fate, chance, luck or powerful others rather than one's own actions (Rotter 1966). As some of the women appeared to have been recipients of 'good'

instruction yet didn't practise them, and conversely other women received no information from the medical profession yet did practise them, it appears that factors such as personality and beliefs have had some influence on behaviour. This may also help to account for the differences in health behaviours generally between the exercisers and non exercisers. Other factors, may however, play a part including socio- demographic and cultural variables.

9.2.8 Recommendations

For Clinical Practice

From the evidence presented above, improvements in the instruction of pelvic floor exercises could be introduced. These should focus on three areas: a) the organisation of service provision b) the exercise programme c) the rates of compliance.

a) The Organisation of the service provision

- Providing instruction to women in pelvic floor exercises should be made the sole responsibility of one of the health care professions.
- Responsibility for the task should lie with the midwives as they provide care for women during the antenatal period when the information should be imparted.
- Instruction in pelvic floor exercises should be made explicit in the policies and protocols governing practices, not left to the discretion of the individual.
- The instruction should be provided routinely as part of the antenatal care, rather than during antenatal or other voluntary classes, which are only attended by a proportion of the women.
- A multidisciplinary approach should be adopted with respect to reminding women to do exercises.
- The 'optimal' exercise programme should be defined and adopted by all instructors.

- Guidelines, and training where necessary, should be given to those providing the instruction. This should be updated when new information becomes available.
- The practice of leaving leaflets for women during their stay in hospital without introducing the subject should be discontinued in favour of a more appropriate means of instruction (see below)

b) The Programme Of Exercise

- The instruction should be given verbally and visually, providing women with the opportunity to ask questions.
- A good handout should be devised and provided - not for instruction purposes but to serve as a permanent record or reminder. A video would provide an alternative source of record for those women who were unable to read.
- The instructor should be made aware of the difficulty women have isolating the correct muscle group.
- The instruction should emphasise the need to avoid contracting the abdominal, gluteal or thigh muscles, and to avoid 'bearing down'.
- A check should be incorporated into the instruction to ensure that woman can perform an effective pelvic floor contraction. Although vaginal palpation is a method used by many experts, if the exercises are being taught as a preventative measure, a less invasive check such as self palpation, may be more appropriate and acceptable to the women.
- The women should be instructed in the 'optimal' exercise programme. This should include both sustained and maximal contractions and regular sessions of exercise per day. A gradual schedule in which women can build up their muscle strength and endurance according to their differing abilities, may be the most effective means of exercising the pelvic floor.

c) Compliance

- As part of the instruction, the women should be made aware of the role of pelvic floor exercises in preventing or treating stress incontinence. The possible consequences of not doing the exercises should also be stressed.
- Women should also be informed of the other possible benefits of exercising the pelvic floor i.e., increased sensation during intercourse, relief from perineal congestion lessening the likelihood of haemorrhoids, and promotion of healing after stitches or a tear.
- The importance of daily, regular exercise needs to be emphasised.
- As stated, reminders need to be issued.
- As stated, the exercise programme should allow for differences in the women's abilities and the goals should be realistic and attainable.
- As stated, a check should be made to ensure the correct muscles are being contracted.

9.2.9 Pelvic Floor Exercises In The Postpartum

The results from the present study showed that pelvic floor exercises did not appear to be beneficial to women at this time. This confirmed the findings from studies by Jolleys (1988), Becket (1987) and Wilson *et al* (1996) but contradicted those of Morkved and Bo (1996). Sleep and Grant (1987) reported that there was no difference found in the prevalence of urinary incontinence between women who underwent an intensive postpartum exercise programme and those who followed the usual instruction. The lack of evidence to show that the exercises are beneficial at this time in some of the studies may have resulted from one or more of the following factors: a) difference in the focus of the

studies, or b) differences in the programme of exercise. It is also possible the effects do not become evident at this point in time.

Many studies such as those by Lagro-Janssen *et al* (1991), Hahn *et al* (1993) and Morkved and Bo (1996) employed a case control study design. The participants were assessed with respect to their continence status and the severity of their symptoms prior to and following a programme of treatment. The effectiveness of the exercises was measured by comparing symptoms at these two stages in time. The findings took into account the degree of improvement as well as the cure rate. In contrast, studies such as those by Wilson *et al* (1996), Jolleys (1988) and the present study, measured the effectiveness of the exercises by comparing prevalence of stress incontinence amongst those women who undertook pelvic floor exercises with those who did not. It is likely however that those women who were troubled by stress incontinence were more likely to perform pelvic floor exercises in an attempt to control their symptoms. This method also took no account of the improvements in their condition which some of the participants may have sustained.

A second explanation is related to differences in study parameters. In contrast to Jolleys (1988), Wilson *et al* (1996) and the present study, studies by Lagro-Janssen *et al* (1991), Henalla *et al* (1988) and Hahn *et al* (1993) incorporated the factors discussed above. Participants in their studies underwent urodynamic testing. Only those with proven stress incontinence were entered into the study. Participants were taught the exercises by a physiotherapist who also ensured that each participant could perform an effective muscle contraction. The programme itself involved repeated sessions of exercise per day, comprising a series of both slow and fast muscle contractions. The length of time over which the treatment was carried out usually consisted of a three month period. The rate of

compliance was also taken into consideration. In contrast, participants in the present study, and also Wilson *et al's* (1996), did not undergo urodynamic testing. It is therefore possible that some participants had some other form of incontinence or urological problem which might not necessarily respond to treatment with pelvic floor exercises. Instruction in pelvic floor exercises consisted of the routine instruction of pelvic floor exercises which women received during pregnancy or following delivery. Whilst details of this were not reported in Wilson *et al's* study (1996), many women in the present study did not receive one to one instruction, or a check to verify they were performing the exercises correctly. It is therefore possible that a large proportion were performing them incorrectly. The programme recommended varied between participants, and frequently did not differentiate between fast and slow contractions. Many women performed the exercises on an irregular basis. Finally, the exercise took place over a period of less than eight weeks (if antenatal exercises were not taken into account).

A third explanation is that the benefits of pelvic floor exercises may not be evident so soon following delivery. Reinnervation following nerve damage, caused by stretching or compression during parturition, may take a while. Findings from studies assessing nerve damage during labour disagree with respect to the length of time it takes for reinnervation and recovery to occur. Snooks *et al* (1984b) reported that substantial recovery from nerve damage occurred in the first two months postpartum, although it was least complete in multiparous women. In contrast, Sultan *et al* (1994) measured PNTML six to eight weeks following delivery and found it to be significantly increased compared to antenatal values. Tetzschner *et al* (1997) measured PNTML at twelve weeks postpartum and found it to be increased in women having had a vaginal delivery and especially those having had a vacuum extraction. (Prolonged conduction times are indicative of nerve damage).

Until the nerve supply is sufficiently restored to the pelvic floor so that the muscles regain their functioning capacity, the benefits of pelvic floor exercises may not become evident. Cortical awareness may also be lost when the perineum is painful following an episiotomy or tear. The muscles of the pelvic floor become unresponsive to voluntary effort and specialist treatment may be required to stimulate cortical awareness.

Any beneficial effects of pelvic floor exercises may be further masked by the influence of hormones which affect the ability of the pelvic floor to withstand pressure at this time. Although most of the hormonal changes which occurred during pregnancy are believed to reverse within 30 days, the anatomic effects of relaxin are believed to last for twelve weeks or so (Mittlemark, Wiswell and Drinkwater 1991). During breastfeeding, low oestrogen affects the ability to provide a watertight seal in the urethral mucosa (Bonnar *et al* 1975), although oxytocin improves the tone of smooth muscle.

9.2.10 Summary

To summarise, whilst the majority of studies carried out in the postpartum period did not find pelvic floor exercises to be beneficial, a number of reasons have been put forward to explain these findings. In light of the study by Morkved and Bo (1996) which shows improved muscle strength following postpartum exercise, it is concluded that the lack of evidence largely results, as suggested, from the study design or exercise regime.

9.2.11 Recommendations

For Future Research

Further research should be undertaken into the effectiveness of carrying out pelvic floor exercises in the postpartum period. Studies should incorporate the following elements

- A randomised control trial methodology.

- Some measure of the level of improvement, in addition to the rate of 'cure'.
- The exercise programme should incorporate those elements (as discussed above) which help to promote efficacy.
- The compliance rates should be taken into account when considering the results.
- The duration of the study should allow time for the hormonal effects to disappear and for reinnervation to occur.
- The research should follow on from that by Morkved and Bo (1996) by measuring the prevalence of stress incontinence as an outcome measure.

9.2.12 Antenatal Pelvic Floor Exercises

Few studies have been carried out to investigate the effects of antenatal exercises. Whilst the evidence conflicts to some extent, it is possible that antenatal exercises may help to prevent stress incontinence occurring in the postpartum. Evidence from published studies is discussed below in addition to that of the present study.

Allen *et al* (1990) and Sultan *et al* (1994) found no correlation between the degree of pelvic floor damage and use of the exercises. However, Henderson (1983) and Neilson (1988) reported that women who performed antenatal exercises were able to perform a more effective pelvic muscle contraction in the postpartum. It is possible that differences in the findings resulted from differences in the amount, type and duration etc. of exercise carried out, as discussed previously. Neither Allen *et al* (1990), nor Sultan *et al* (1994) reported on the nature of antenatal pelvic floor exercises. Consequently analysis may have been undertaken on women who performed frequent daily exercise or alternatively, exercised infrequently and rarely during this period. In contrast, women in the studies by Henderson *et al* (1983) or Neilson *et al* (1988) were specifically provided with one to one instruction and supervision of the exercises, which consisted of 100 contractions per day during the last trimester.

Findings from the present study were similar to those of Wilson *et al* (1996). Both studies considered the effect of antenatal exercises amongst a population of women attending routine services. In neither study were women provided with treatment specific for study purposes. Neither study found an association with respect to whether the exercises were performed antenatal and postpartum stress incontinence. However, a significant association was apparent when the frequency of exercise was taken into consideration. Wilson *et al* (1996) reported that antenatal exercises performed daily were associated with a reduced

prevalence of incontinence. This effect was not evident amongst women who performed the exercises on a less frequent basis. The present study also found that women who performed the exercises several times a week or on a daily basis were significantly less likely to have stress incontinence in the postpartum compared to women who did them occasionally or just once per week. Interestingly, women who did not perform the exercises at all were also less likely to report stress incontinence. Some of the differences between these groups i.e. a) ethnicity, b) age c) use of entonox, or spinal anaesthesia, d) weight of the baby, were also found to be directly associated with the prevalence of stress incontinence. It is possible therefore this anomaly was due to a confounding effect of ethnicity, age or birthweight as significant differences were found between the group of women who exercised and those who did not.

Sampselle, Miller, Mims, DeLancey, Ashton-Miller and Antonakos (1998) found that women who received standardised instruction in pelvic floor exercises at twenty weeks gestation, reported fewer symptoms of urinary incontinence and had increased muscle strength during pregnancy and in the postpartum compared to controls. The exercise regime was tailored to the women's' ability and correct pelvic floor contraction was verified in each participant. Compliance with the exercises was reported to be high.

9.2.13 Summary

It would appear that pelvic floor exercises performed during the antenatal period reduce the likelihood of developing stress incontinence in the postpartum. However, it seems that the exercises need to be carried out on a frequent basis, possibly daily, before any effect becomes evident.

9.2.14 Recommendations

For Future Research

It follows from this that further research would be useful to confirm or refute the study findings. A study design should involve the following:

- A randomised control trial study design.
- The participants should take part in an exercise programme that incorporates the elements discussed above.
- The compliance rate should also be monitored.
- The sample should be large enough to allow for statistical partialling out of confounding factors.

9.3 The Physical, Emotional and Practical Problems Associated With Stress Incontinence

9.3.1 Introduction

The following section of the chapter will consider the physical, emotional and practical problems associated with being stress incontinent during pregnancy or following delivery. The data was gathered by means of unstructured interviews conducted with women who had symptoms of stress incontinence at eight weeks postpartum, and / or at one year following delivery. This method was chosen in order that those issues important to the women themselves were highlighted. Forty two interviews were carried out with women at eight weeks postpartum and a further fifteen with women who were still incontinent at one year following delivery.

Findings relating to how the women were affected by their condition, their subsequent behaviour and health needs, reflected the body of literature on the theory of coping mechanisms. 'The term coping describes the range of responses for dealing with everyday

hassles and stressors as well as with the demands and threats of illness and related treatment. It refers both to the thought processes and the actions which are used' (Weinman, Wright and Johnston 1995) Coping strategies are not fixed but instead vary over time, according to changes in the stressor, or the individual's mood or capability (Cohen, Reese, Kaplan and Riggio 1986). Comparisons of the women's accounts at three and twelve months postpartum showed differences which may have resulted from changes in the condition itself, and / or the individual's response to it. Individuals display a wide range of coping behaviours which differ according to different aspects of the same stressor. In the present study, different forms of coping strategies were evident both across the sample and also within each individual narrative. The following section will therefore summarise the findings from the interviews and discuss these, where relevant, in relation to the literature on coping. Recommendations for practice and further research will also be presented.

9.3.2 Limitations Of The Data

It is possible that the data was limited as a result of the method used to recruit interviewees. Women who reported on the questionnaire that they had symptoms of stress incontinence were sent a letter asking if they would like to take part in an interview. A reply slip was enclosed for their convenience. All women who agreed to take part were recontacted and an appointment made for a time convenient to them. Although all women with symptoms of stress incontinence were contacted and invited to take part in an interview, this method may have resulted in some element of self selection bias and possibly a lower response rate than if the women had been invited to participate in person or over the telephone. It is possible that those women who responded felt more at ease talking about their condition. Their perspective may therefore have been somewhat different to those not willing to talk about it. However, the final sample included women of

all ages, parity, ethnicity and degree of severity with respect to their condition and they also appeared to have been in receipt of very different levels of service.

Although only fifteen women were interviewed in the follow up study, this accounted for one fifth of the women with stress incontinence at this time. In addition, as the themes were repeated throughout the course of these interviews this indicated that saturation had occurred.

Despite the lack of rules regarding rigor associated with qualitative studies, many alternative strategies suggested in the literature were adopted. The fittingness of the results to a wider population has been described. The data is believed to be representative of women using antenatal and postnatal services in two hospitals in the North West of England. The analysis involved returning to the raw data repeatedly in order to check that the issues described had not been taken out of context, over-represented or exaggerated. Describing the phenomena in terms of the number of women involved also helped to measure the degree of importance attached to the issues. The accounts included both atypical as well as typical events were relevant. The findings were also examined in light of other studies on incontinence. Although these studies mainly considered older women, and those with all types of urinary incontinence, many although not all, of the findings were replicated in the present study. By showing the numbers of women involved in each of the items, and illustrating the text using quotes, the decision making process should appear visible and logical to outside readers.

9.3.3 The Reasons Why Women Do Not Seek Help For Stress Incontinence

As commonly reported in incontinence studies, (Norton *et al* 1988, Holst and Wilson 1988, Rekers *et al* 1992, Reymert and Hunskaar 1994) few of the women had sought help for their condition. Just seven of the forty two women interviewed at eight weeks postpartum and three of the fifteen at one year follow up had sought help. In the present study there were two main reasons for this; a) the women did not want help, or did not want to admit that they did. b) they did not want to discuss the condition with a health professional.

a) Some of the women reported that the condition was not causing a problem, therefore they had no reason to seek help. This has also been reported in other studies as a major reason for not seeking help (Reymert and Hunskaar 1994, Jolleys 1988). However, whilst this appeared to be true in some cases, some of the accounts described by the women in the present study would suggest otherwise. There appeared to be an unwillingness to admit, either to themselves, or to the interviewer that their condition was a problem. This behaviour may be adopted as part of a coping strategy. The literature (Horowitz 1974, Lazarus and Folkman 1984) describes denial or self deception as common ways of confronting a problem. Denial as a mechanism may be both effective or ineffective depending on how and why it is used. It can be useful in terms of minimising distress and therefore facilitating coping. Contrary to this, it may create additional problem if it means the person fails to engage in appropriate action such as seeking medical attention (Lazarus and Folkman 1984, Carver, Sheier and Wentsraub 1989). Ashworth and Hagan (1993) described a similar situation whereby women in their study also minimised their problem as a way of coping with it. Whilst the conclusions in the present study were not reported by Reymert and Hunskaar (1994), or Jolleys (1988), this may have resulted from differences in the methodologies. The above studies used questionnaires to obtain data rather than interviews. Thus they did not have rich narratives, where the women spoke in

detail about their condition, which in turn allowed greater interpretation and understanding of their views.

Some women saw the condition as an inevitable consequence of childbearing. Because of this they were able to regard it with less concern. This form of coping strategy, known as passive acceptance, does nothing about the condition itself but does aid distress. Some of the women in Ashworth and Hagan's study (1993) shared similar beliefs and again accepted the condition as a fact of life. One quarter of the women in Goldstein, Hawthorne, Engberg, McDowell and Burgio's study (1992) had not sought treatment because they believed incontinence was a normal occurrence after childbearing.

b) Other women in the present study admitted that they would like help but were reluctant to discuss their condition with a health care professional. This reluctance seemed to stem from the nature of the condition itself but was exacerbated by the type of the relationship between the women and the health professional. With respect to the condition, the women regarded it as something of a taboo subject and were embarrassed by having it and equally embarrassed in some cases talking about it. Many other studies have reported a similar situation (Norton *et al* 1988, Rekers *et al* 1992) although Holst and Wilson (1988) and Reymert and Hunskaar (1994) stated that embarrassment was not the main reason given for not seeking help by the women in their studies. However, this may have been, as Reymert and Hunskaar (1994) acknowledged, due to 'the way the women are asked and whether they feel safe enough to talk about such sensitive feelings' (p182). With respect to the taboo nature of the condition, an article by Faugier (1988, p19) reflected upon the construction of the term incontinence. 'Lack of self restraint, an inability to control aspects of the self which society deems it desirable should be controlled'. Incontinence is viewed as a social problem rather than a medical condition. The lack of control over a bodily function

taught as a child is seen as socially unacceptable. Because of this, the taboo is reinforced. Ashworth and Hagan (1993) reported that because of the taboo it became a socially unacceptable topic of conversation, whereby sufferers avoided talking about it not just with friends and family but also health professionals as well. Indeed many women in the present study were reluctant to approach health professionals themselves but would have welcomed the opportunity to discuss it. The key finding was that health professionals needed to initiate the conversation. Where health professionals made general enquiries after the women's health, it was often viewed as a polite gesture rather than a specific question that could initiate a conversation about stress incontinence or the like. For some women, a direct reference to the condition was needed before they could bring themselves to talk about it. A number of women expressed surprise that they were not questioned as to whether they had stress incontinence, particularly when they attended for the six week postnatal examination.

The reluctance to seek professional help appeared to be exacerbated by the nature of the women's relationship with some of the health professionals. A number of issues emerged within this context. Dissatisfaction with a number of aspects of care led to a general unwillingness to seek professional help. A minority of women felt that certain health professionals were unapproachable. Others worried about the reaction of the health professionals. They assumed their condition would be perceived as a minor problem and thus a waste of the health professionals' time. Studies that have explored physicians' responses to consultation for incontinence, albeit with older women and all types of incontinence, showed the response to be generally unsatisfactory. Thomas (1990) reported that 48% of physicians either ignored or provided a dismissive explanation. A similar response was reported by Simons (1985). Evidence from the above studies indicate that the women's reluctance to seek professional help may have been justified.

Another factor which stopped some women from seeking help was that they were unable to identify who they should consult in this matter, particularly as they felt that they had lost contact with health professionals too soon after the birth of their child. As maternity services have evolved in response to Changing Childbirth (1993) and advances in health care, this has led the roles, skills and training of maternity carers to change. Midwives, health visitors and nurses have taken over some tasks traditionally performed by Doctors. It is therefore not surprising that many women were unsure of the different roles of the health professionals and who they should consult in such matters. This is especially likely when the professionals themselves were unclear about whose role it was to provide care in stress incontinence. Some of the women spoke of a situation whereby the health professionals focused upon their child's needs with their own being secondary to this. Again, this had the effect of distancing the women from the services.

Finally, some women reported that they knew pelvic floor exercises could help the condition and therefore did not feel anyone could provide further assistance. However in light of the findings on the teaching of pelvic floor exercises, it is likely that much more assistance could have been provided in this respect. Others felt somewhat to blame for the condition as they had not practised pelvic floor exercises, or had not done them often enough. Had they done so, the condition could have been prevented or alleviated. Consequently, or so they thought, health professionals would also blame them. This prevented women from seeking help.

As stated previously, it is widely acknowledged in the literature, and confirmed in the present study, that many women do not seek help for incontinence. Although in some cases it is because they do not feel they need help, others refrain for a number of

reasons. Comments made as part of the health professionals survey showed that many health professionals appeared to be aware of the situation. Despite this, with the exception of the physiotherapists, no single profession appeared to make a routine check as part of their duties, to find out if the women they provided care for suffered from this condition.

9.3.4 Summary

Women of all ages appear to be reluctant to seek medical help for this condition, irrespective of the type of incontinence they have. The women in the present study were no exception to this. Although some women stated that they did not need help, in some cases this may have been a form of denial or passive acceptance adopted as a coping strategy. The main reasons for not seeking help related to the nature of the condition and the embarrassment women felt in talking about it. The nature of the women's relationship with health professionals also affected the decision whether or not to seek help. Lastly, some women believed there was no point as they had already been provided with information about pelvic floor exercises.

9.3.5 Recommendations

For Clinical Practice

Some of the following recommendations are specific to the condition of stress incontinence, others have implications for antenatal and postnatal services generally.

- A greater awareness of the condition should be promoted in order to lessen the taboo associated with the condition.
- In particular, women should be provided with information on the condition during pregnancy, to serve as a warning that the condition could occur at this time and following the birth.
- Women should be made aware that help is available for the condition

- The roles and responsibilities of the different health professionals involved in antenatal and postpartum care should be made clearer to women - with respect to stress incontinence, the roles and responsibilities of health professionals need to be organised internally (see previous).
- Health professionals should be made aware of the reluctance of women to discuss stress incontinence and the different coping styles which may result in not seeking help.
- Health professionals also need to be aware of the need for discussion to be initiated by themselves, together with a sound knowledge of what can be done.
- The six week postnatal check may be appropriate for this purpose.
- Health professionals should be reminded of the need to focus on the woman as well as her child.

9.3.6 The Effects Of Stress Incontinence

According to the WHO (1980) (cited by Brandsma, Lakerveld, Heyl, Van Rowensberg and Heerkens 1995) an impairment is 'any loss or abnormality of psychological or anatomical function'. Stress incontinence could therefore be viewed as such. However, it could also be classed as a disability. A disability being defined as 'any restriction (resulting from an impairment) or lack of ability to perform an activity in the manner or within the range considered normal for a human being'. During the interviews it became apparent that some women described their condition in terms of a disability. This was not just contingent on the severity of the condition, but also upon the women's personality and their experiences. How they dealt with their condition as individuals needed to determine whether the condition was an impairment or became a disability to them.

The narratives described the condition in three distinct ways. These were in relation to a) daily life b) putting into a context c) feelings and emotions. Within these, the two elements of coping described in the literature became evident. Much of the current literature makes a distinction between two types of coping, problem focused and emotion focused. Emotion focused coping is the regulation of distressing emotions. Problem focused coping is doing something to change for the better the problem causing the distress (Folkman and Lazarus 1985). During the initial stages of the interview which focused on daily life, the women described problem focused ways of coping. When the women spoke of the condition in context, or described their feelings associated with it, emotion focused strategies were evident.

As stated above, the majority of women first spoke of their condition in terms of the practicalities of daily life. Routines were described to ensure that the problem did not occur, or which minimised the problem. These included wearing pantyliners or sanitary towels, frequent emptying of the bladder, or the avoidance of certain activities. These problem focused strategies seemed to be adopted consistently across the sample of women and became a routine way of life.

The avoidance of certain activities was also adopted, in many cases, as an emotion focused coping strategy. It helped to keep the condition hidden from others, in some instances promoting the strategy of self denial or avoidance. For whatever reason this strategy was adopted, many of the women interviewed at three months postpartum were restricted or chose to restrict their activities because of their condition. This was one of the major effects of the condition described by the women. Abstention was usually from physical activities which sometimes involved their partners and / or their children. This involved exercising, for some women sexual activity, and simple tasks such as running for

buses, or playing with their children. The condition also placed restrictions on their social life, usually because they wanted to keep the condition hidden. Other studies also reported on the restrictions placed on the women's lives by their incontinence (Hunnskaar and Vinses 1991, Lagro - Janssen *et al* 1992, Lam *et al* 1992, Dowd 1991). Again, these were usually in terms of physical activity or the avoidance of social events. The restrictions which involved children have not been reported in other studies. However, it is likely this is because other studies have not examined the effects of stress incontinence on women in their reproductive years. At one year postpartum, the women's accounts focused less on the restrictions. This may have reflected an improvement in the severity of the condition, or alternatively, a change in attitude towards the condition as a result of adaptation of coping strategies.

In contrast, the women appeared to be less confident talking directly about psychological effects of stress incontinence. Much of the understanding and interpretation was gathered by looking at what the women did not say, or how they spoke, in terms of the language used or the context. The coping strategies they adopted were less well defined in comparison to the problem focused strategies. These emotion focused strategies also appeared to be adopted less consistently across the sample. Emotion focused strategies described by Folkman and Lazarus (1985) include wishful thinking, distancing, seeking social support, self blame, tension reduction, emphasising the positive and self isolation. Examples of all of these strategies were found in the narratives, although distancing and self isolation were recurring strategies throughout many of the accounts. A strong desire or need to keep the condition secret was evident throughout the narratives. One of the biggest fears described by the women, was for others to find out that they had the condition. For this reason, as already stated, the women restricted their social activities. Dowd (1991), Lagro - Janssen *et al* (1992), and Ashworth and Hagan (1993) also

reported on the need for secrecy amongst the women in their studies. One third of the women in Reymert and Hunskaar's study (1994) had never talked to anyone about their incontinence. Dowd (1991) suggested that for many women even talking about it would pose a threat to their self esteem. A minority of women in the present study spoke of not wanting their partners to find out. Ashworth and Hagan's study (1993 p1419) similarly reported that 'sexual partners often had little or no idea of the existence of the problem'. Much of this behaviour resulted from feelings of embarrassment in connection with the condition, which is seen as a taboo subject. This has also been described in other studies (Norton *et al* 1988) and Lagro - Janssen *et al* 1992) and was described by Ashworth and Hagan (1993) as one of the main effects of incontinence. This was one of the two main emotions which were acknowledged by the women, the other being worry. Some women spoke of worrying about the condition for a number of different reasons; that it was not going to get better, or that it would become worse in the future. Other fears included leaking in a public place, or during sex, or others finding out that they had the condition. Many of the worries, like the feelings of embarrassment, stemmed from the taboo associated with the condition. One of the fears reported in other studies but not evident in the present study was that of odour (Dowd 1991, Lagro-Janssen *et al* 1992, Norton 1982). This may have been due to differences in the type of incontinence and the widespread use of pantyliners in younger women. Stress incontinence is associated with only a small amount of leakage in contrast to urge incontinence or nocturia.

Other women, whilst not actively worrying about it, were constantly aware of the condition. Some of the women's accounts described a constant psychological pressure. Similarly, 'anxiety, fear and never being able to relax and forget the problem', were recurrent comments made by the women in Norton's study (1982 p11).

Rather than keep the condition secret, a few women sought social support. Women who felt able to talk about the condition with partners, family or friends were, in the main, rewarded, finding that it helped them to be able to discuss the condition openly. In some cases family or friends were good sources of information and reassurance about the condition. In a couple of instances the social support was not felt to be helpful as the condition was trivialised. Again, possibly because it was taboo and felt to be socially unacceptable, others treated the condition as humorous. The responses to incontinence by others has not been well studied and is usually limited to the elderly and those with urge incontinence or nocturia (Lipman 1968, Noelker 1987). However, how others, particularly significant others respond may affect the way sufferers act and feel and is therefore an important issue to be considered.

Another strategy commonly adopted was that of denial. Many of the women dismissed the problem when asked directly about it, yet elsewhere in the interview described how the condition affected them in very negative terms. Some women appeared to disassociate or distance themselves from the condition by not speaking directly about it. Most women just used the word 'it' to describe their condition, occasionally the word 'leakage' was used. Whilst distancing may be effective, it also illustrates that the women have not acknowledged or accepted the condition. Ashworth and Hagan (1993) also found that women did not talk or possibly even think about the condition clearly. By talking about it they were effectively breaking a social taboo. Yet by not talking about it they had not developed a vocabulary to deal with it, or had developed a problem solving strategy.

Some women were able to see the condition as a consequence of pregnancy or birth. As such it was not an abnormal condition but instead was rather inevitable and consequently less of a problem to the women.

The varying impact that the condition had on the women's lives may have been related, to some extent, on the severity of the condition itself. Other studies reported an association between the severity of the condition and the impact it had on the sufferer (Wyman *et al* 1987, Vines and Hunskaar 1991, Samuelson *et al* 1997). However the degree of association found was modest, suggesting a complex relationship between the two. The coping strategies adopted by each individual appeared also to have played a part in the impact of the condition. The way a person copes is determined partly by personal factors as well as environmental and social resources. Personal factors include such things as health and energy, beliefs about control, existential beliefs, social skills, cultural values. Other factors include social support and material resources (Lazarus and Folkman 1984). Many differences between the women were evident in the present study. Some of the women stated that they would not let the condition become a problem as it wasn't in their nature. Others worried about it continually. Some women had a positive outlook due to their belief that the condition would ease in time, whilst others felt that it would not, or would even become worse. Some women sought social support from their friends and family whilst others deliberately hid it from people they were close to. These differences meant that the women coped in different ways and with differing degrees of success. A small number of women were unable to accept it, or denied it, and consequently appeared to suffer to a greater extent because of this.

At twelve months, the narratives in the present study appeared to show that the effects had eased to some extent. This may have been due to changes in the condition itself, or in the women's perceptions of it. It is also possible that the data was limited by only fifteen women participating in the interview. As already stated, it is possible that those women willing to be interviewed held slightly different perceptions or were different in character

compared to those who did not wish to be interviewed. Only one of the women interviewed at twelve months following delivery felt that her condition had worsened during the previous months, others felt that it had improved, whilst for some it had remained the same. However, some of the women felt that their perceptions of it had altered. This form of emotion focused coping is described as cognitive reappraisal (Lazarus and Folkman 1984) which allows changes in the way an encounter is construed without changing the objective situation. For some of the women the reappraisal was beneficial, they came to view the condition as less of a problem because it had not got any worse, or they had become used to it. For other women reappraisal was an ineffective coping strategy as they came to see the condition as a greater problem because it had not improved.

Two women were however still deeply troubled by the condition. Both were severely restricted in their activities, and worried about their condition because it had not got any better over time. They were also embarrassed by it and fearful of other people finding out that they had the condition. Neither had sought help, although one had made an appointment at the time of interview. The other felt that she was to blame as she had not done pelvic floor exercises, consequently she felt the doctor would only say it was her own fault. A similar picture to this has been reported in other studies on incontinence. Jolleys (1988), Macauley *et al* (1987), Wyman *et al* (1987), and Lagro -Janssen *et al* (1992) also found that a small proportion of women were greatly affected by their incontinence irrespective of the type of incontinence, or the severity of the condition. For these women the symptoms had a deep psychosocial impact on their lives.

9.3.7 Summary

To conclude, the effects of stress incontinence on women following delivery bore many similarities to the effects of incontinence on the general population as reported in the

literature. Many women felt restricted by their condition and felt the need to keep it hidden from others. They spoke about feelings of embarrassment or worry in connection with the condition. One additional effect, found in the present study, related to the restrictions on family oriented activities such as playing with children. Whilst the effects generally seemed to lessen over a period of time, this may have resulted from either a change in the severity of the condition itself, or a change in the coping strategy adopted. Many of the coping strategies adopted mirrored those reported in the literature on coping with stress or illness. In common with other studies on incontinence, a small number of women were found to be greatly affected both physically and psychologically.

9.3.8 Recommendations

For Clinical Practice

- As already stated, there is a need to promote awareness of the condition in order to lessen the taboo and the need for secrecy felt by sufferers.
- To make people aware of the causes of the condition in order to help put it within the context of a medical framework, rather than a social condition, in order to help reduce the stigma associated with it.
- To offer practical and emotional support to those women who are troubled by the condition.

For Future Research

- It may be useful to explore, (although potentially difficult to carry out), the views of those who are close to women who suffer from the condition. Also to find out how they are affected by the condition and what support, if any, they provide.

9.4 Summary Of Recommendations For Future Research

Recommendations for future research have arisen from the need to; clarify the contradictory findings within the present study, extend the methodology used, explore new issues arising from the findings, and lastly to monitor the effectiveness of any changes made as a result of the study findings.

Although studies have looked at the association between risk factors and stress incontinence, much of the evidence is somewhat confusing. Further clarification of the role of these variables, i.e. operative delivery, age, length of labour, birthweight and head circumference would contribute towards the understanding of the causes of the condition, identification of those women at risk and lead to possible changes in clinical practice.

Three other variables, cigarette consumption, exercise and ethnicity may also be associated with stress incontinence. Limitations of the present study meant that the findings were not conclusive. Further research would however, be beneficial particularly as cigarette consumption and exercise can be controlled in order to prevent symptoms occurring. Future research into the effect of exercise should measure the frequency of exercise at more than one point in time, i.e. before conception, throughout pregnancy and following delivery. It would also be appropriate to ascertain the duration of exercise and what form it took as this may affect muscle response. Similarly, cigarette consumption should be measured before conception, during pregnancy and following delivery so that changes in smoking habits could be taken into account. Equally important is the need to get a true measure of consumption. This may be best achieved by not employing a health professional to do this.

Understanding how differences in ethnicity lead to differences in the prevalence of stress incontinence, should this be the case, would further the understanding of causes of stress incontinence. Future research should incorporate a large sample of women from differing ethnic backgrounds so that each group comprises of large numbers of women. Measures should be taken to ensure that response rates for all groups are high. Similar to the present study, possible risk factors should also be considered for each group so that any reasons for possible differences in the prevalence may be explored.

Whilst studies have shown that a caesarean section appears to protect from stress incontinence, the effect is not complete. Following delivery a small proportion of women develop stress incontinence. Further research should focus on those women who have had a caesarean section and make comparisons between an elective or emergency section to ascertain whether labour itself contributes to the development of stress incontinence or whether some other mechanism is responsible.

Although the present study considered the prevalence of stress incontinence in the long term, this could have been improved by following up all women over a period of time, rather than just those who were symptomatic. Any future research could investigate whether symptoms started, or the women only became aware of them, later in the postpartum. For example possibly once they had begun to exercise. This would also allow examination of risk or associated factors for long term stress incontinence.

Whilst a number of studies have explored the efficacy of pelvic floor exercises, the optimal programme of exercise with respect to all parameters, i.e. methods of instruction, frequency, type, duration and timing of exercise, level of supervision, compliance rates,

has not been investigated in any depth. This would be an important topic for future research.

Future studies should also be undertaken with respect to the role of pelvic floor exercises to help clarify their effectiveness both in the antenatal period and the postpartum. Study participants should be provided with good instruction, incorporating those elements which help to promote efficacy and compliance. Any study investigating the efficacy of postpartum pelvic floor exercises should also incorporate a case control study design to overcome the effect whereby women exercised as a consequence of their stress incontinence. Also, whilst the present study measured the effect of exercise up to eight weeks postpartum, future studies should be carried out later in this period which would allow time for hormonal effects to lessen and for reinnervation to occur.

Although the effects of stress incontinence on the sufferer have been explored, little is known about those who support, or who are in close contact with sufferers. Because of the nature of the condition, sufferers often feel the need to keep their condition a secret yet it seems that for many women in the present study this had an even greater negative effect. It would therefore be useful to explore the perspectives of non sufferers to ascertain their response to the condition. If this was found to be generally positive sufferers may be encouraged to refrain from keeping the condition hidden, if negative, changes in attitude need to be addressed.

The present study has provided some baseline data on the services for women at risk, or suffering from stress incontinence. It has also examined the effects of stress incontinence on the sufferer. Arising from this research a number of recommendations for clinical

practice have been suggested. Should any changes be implemented, the effects should be monitored.

Bibliography

- Aaronson, IA. Ramei, RA. Greene, WB. Walsh, LG. Hasal, UA. and Garen, PD. (1993). Endoscopic Treatment Of Reflux: Migration Of Teflon To The Lungs And Brain. European Urology, 23, 394-399.
- Abrams, P. Blavias, JG. Stanton, SL. and Anderson, JT. (1988). The Standardisation Of Terminology Of Lower Urinary Tract Function. Scandinavian Journal of Urology & Nephrology Supplement. 114, 5-9.
- Allen, RE. Hosker, GL. Smith, ARB. and Warrell, DW. (1990). Pelvic Floor Damage And Childbirth: A Neurophysiological Study. British Journal of Obstetrics and Gynaecology, 97, 770-779.
- Appleton, JV. (1995) Analysing Qualitative Interview Data: Addressing Issues Of Validity And Reliability. Journal Of Advanced Nursing, 22, 993-997.
- Aquilino, WS. (1994). Interview Mode Effects In Surveys Of Drug And Alcohol Use. Public Opinion Quarterly, 58, 210-240.
- Ashworth, PD. and Hagan, MT. (1993). The Meaning Of Incontinence: A Qualitative Study Of Non-Geriatric Urinary Incontinence. Journal of Advanced Nursing, 18, 1415-1423.

Baron, JA. La Vecchia, C. and Levi, F. (1990). The Antiestrogenic Effect Of Cigarette Smoking In Women. American Journal of Obstetrics and Gynecology, 162, 502-514.

Beck, RP. and Hsu, N. (1965). Precipitating Factors In Stress Incontinence. American Journal Of Obstetrics and Gynecology, 91(6), 820-823.

Beckett, J. (1987). Incontinence and Childbirth. Health Visitor, 60, 12-13.

Beischer, NA. and MacKay, EV. (1988). Obstetrics and The Newborn. Balliere Tindall: London.

Bentley, D. (1985). Iron Metabolism And Anaemia In Pregnancy. Clinics in Haematology, 14(3), 613-625.

Benvenuti, F. Caputo, GM. Bandinelli, S. Mayer, F. Biagini, C. and Sommovilla, A. (1987). Reeducative Treatment Of Female Genuine Stress Incontinence. American Journal Of Physical Medicine, 66(4), 155-169.

Berghmans, LCM. Hendriks, HJM. Bo, K. Hay-Smith, EJM. DeBies, RA. Van Waalwijk, A. and Van Doorn, M. (1998). Conservative Treatment of Stress Urinary Incontinence In Women: A Systematic Review Of Randomised Clinical Trials. British Journal of Urology, 82, 181-191.

Black, NA. and Downs, SJ. (1996) The Effectiveness Of Surgery For Stress Incontinence: A Systematic Review. British Journal Of Urology, 78, 497-510.

Blavias, JG. (1985). Pathophysiology Of Lower Urinary Tract Dysfunction. Urology Clinics Of North America, 12(2), 215-219.

Bo, K. Hagen, R. Kvarstein, B. Jorgensen, J. and Larsen, S. (1990). Pelvic Floor Muscle Exercise For The Treatment Of Female Stress Urinary Incontinence: III Effects Of Two Different Degrees Of Pelvic Floor Muscle Exercise. Neurourology and Urodynamics, 9, 489-502.

Bo, K. Larsen, S. Oseid, S. Kvarstein, B. Hagen, R. and Jorgensen, J. (1987). Knowledge About And Ability To Correct Pelvic Floor Muscle Exercises In Women With Urinary Stress Incontinence. Neurourology and Urodynamics, 7, 261-262.

Bo, K. Maehlum, S. Oseid S and Larsen S. (1989). Female Stress Urinary Incontinence And Participation In Different Sports And Social Activities. Scandinavian Journal Of Sports Science, 3, 117-121.

Bonnar, J. Franklin, M. North, PN. and McNeilly, AS. (1975). Effect of Breastfeeding on Pituitary - Ovarian Function After Childbirth. British Medical Journal, 4, 82-84.

Bourque, LB. and Fielder, EP. (1995). How To Conduct Self -Administered and Mail Surveys, Sage: London.

Boykin, W. Rodriguez, FR. Brissolara, JP. Thompson, IM. and Zeidmand, EJ. (1989). Complete Urinary Obstruction Following Periurethral Polytetrafluoroethylene Injections For Urinary Incontinence. Journal of Urology, 141, 1199-1200.

Brandsma, JW. Lakerveld-Heyl, K. Van Rowensberg, CD. and Heerkens, YF. (1995). Reflections On The Definition Of Impairment And Disability As Defined By The W.H.O. Disability and Rehabilitation, 17 3/4), 119-127.

Bryar, R. (1988). Midwifery and Models Of Care. Midwifery, 4, 111-117.

Bryar, R. (1995). Theory for Midwifery Practice, Macmillan: London.

Bryman, A. (1988). Quantity And Quality In Social Research, Routledge: London.

Bump, RC. (1993). Racial Comparisons And Contrasts In Urinary Incontinence And Pelvic Organ Prolapse. Obstetrics and Gynecology, 81(3), 421-425.

Bump, RC. Hurt, WG. Fantl, MD. and Wyman, JF. (1991). Assessment of Kegel Pelvic Muscle Exercises Performance After Brief Verbal Instruction. American Journal of Obstetrics and Gynaecology, 165(2), 322-329.

Bump, RC. and McClish, DK. (1992). Cigarette Smoking And Urinary Incontinence In Women. American Journal of Obstetrics and Gynecology, 167, 1213-1218.

Burchell, B. and Marsh, C. (1992). The Effect of Questionnaire Length On Survey Response. Quality and Quantity, 26, 233-244.

Burgio, KL. Locher, JL. Zyczynski, H. Hardin, JM. and Singh, K. (1996). Urinary Incontinence During Pregnancy In A Racially Mixed Sample: Characteristics And Predisposing Factors. International Urogynecology Journal, 7, 69-73.

Burgio, KL. Robinson, JC. and Engel, BT. (1986). The Role Of Biofeedback In Kegel Exercise Training For Stress Urinary Incontinence. American Journal Of Obstetrics and Gynecology, 154, 58-64.

Burnett, CWF. (1979) The Anatomy And Physiology Of Obstetrics: A Text Book for Students And Midwives. Faber and Faber: London.

Burns, PA. Pranikoff, K. Nochajski, T. Desotelle, P. and Harwood, MK. (1990). Treatment of Stress Incontinence With Pelvic Floor Exercises And Biofeedback. Journal of American Geriatric Society, 38, 341-344.

Burrell, G. and Morgan, G. (1979). Social Paradigms And Organizational Analysis. Heineman: London.

Cammu, H. Van Nylen, M. Derde, MP. DeBryne, R. and Amy, JJ. (1991). Pelvic Physiotherapy In Genuine Stress Incontinence. Urology, 38(4), 332-337.

Cammu, H. and Van Nylen, M. (1995). Pelvic Floor Muscle Exercises: Five Years Later. Urology, 45(1), 113 -117.

Campbell,DT. and Fiske, DW. (1959). Convergent and Discriminant Validation By The Multitrait-multimethod Matrix. Psychological Bulletin, 56(2), 81-105.

- Carver, C. Sheier, M. and Wentsraub, J. (1989). Assessing Coping Strategies: A Theoretically Based Approach. Journal of Personality and Social Psychology, 56(2), 267-283.
- Casteleden, CM. Duffin, HM. and Mitchell, EP. (1984). The Effect Of Physiotherapy On Stress Incontinence. Age and Ageing, 13, 235-237.
- Chalmers, I. Enkin, M. and Keirse, MJNC. (Eds) (1989). Effective Care In Pregnancy And Childbirth, Oxford University Press: Oxford.
- Cliff, D. and Deery, R. (1997). Too Much Like School: Social Class, Marital Status and Attendance At Antenatal Classes. Midwifery, 13, 139-145.
- Cohen, F. Reese, LB. Kaplan, GA. and Riggio, RE. (1986). Coping With The Stresses Of Arthritis. (in): Moskowitz RW, and Haug MR (eds) Arthritis And The Elderly. Springer: New York.
- Czaja, R. (1987). Asking Sensitive Behavioural Questions in Telephone Interviews. International Quarterly Of Community Health Education, 8, 23-31.
- Czaja, R. and Blair, J. (1996). Designing Surveys: A Guide To Design And Procedures. Sage: London.
- DeLancey, JOL. (1990). Anatomy and Physiology Of Urinary Incontinence. Clinical Obstetrics and Gynecology, 33(2), 298-307.

De Muylder, X. Claes, H. Neven, P. and De Jaegher, K. (1992). Usefulness Of Urodynamic Investigations In Female Incontinence. European Journal of Obstetrics, Gynaecology and Reproductive Biology, 44, 205-208.

Dept of Health. (1993). Changing Childbirth. Report of The Expert Maternity Group. London: HMSO.

Dillman, DA. (1978). Mail And Telephone Surveys: The Total Design Method. Wiley: New York.

Dimpfl, TH. Hesse, U. and Schussler, B. (1992). Incidence And Cause Of Postpartum Urinary Stress Incontinence. European Journal Of Obstetrics, Gynaecology And Reproductive Biology, 43, 29-33.

Dootson, S. (1995). An In-depth Study Of Triangulation. Journal of Advanced Nursing, 22, 183-187.

Douglas, JD. (1985). Creative Interviewing. Sage: London.

Dowd, TT. (1991). Discovering Older Women's Experience Of Urinary Incontinence. Research in Nursing and Health, 14, 179-186.

Duffy, ME. (1993). Methodological Triangulation: A Vehicle for Merging Quantitative and Qualitative Research Methods. IMAGE: Journal of Nursing Scholarship, 19(3), 130-133.

Eckford, SD. and Abrams, P. (1991). Para-urethral Collagen Implantation For Female Stress Incontinence. British Journal Of Urology, 68, 586-589.

Eckford, SD. Jackson, SR. Lewis, PA. and Abrams, P. (1996). The Continence Control Pad - A New External Urethral Occlusion Device In The Managment Of Stress Incontinence. British Journal of Urology, 77, 538-540.

Elia, G. and Bergman, A. (1993). Pelvic Muscle Exercises: When Do They Work?. Obstetrics and Gynecology, 81(2), 283-286.

Eriksen, BC. and Eik-Nes, SH. (1989). Long Term Electrostimulation Of The Pelvic Floor: Primary Therapy In Female Stress Incontinence. Urology International, 49,90-95.

Fahey, W. (1983). Models of Health and Ill health. Midwife, Health Visitor and Community Nurse, 24(1), 33-35.

Faugier, J. (1988). incontinence: Hidden For Whom? Senior Nurse, 8(3), 19-20.

Ferguson, KL. McKey, PL. Bishop, K. Kloen, P. Verheul, JB. and Dougherty, MC. (1990). Stress Urinary Incontinence: Effect of Pelvic Muscle Exercise. Obstetrics and Gynecology, 75(4), 671-675.

Fielding, NG. and Fielding, JL. (1986). Linking Data. Sage: Beverley Hills.

Folkman, S. and Lazarus, RS. (1985). If It Changes It Must Be A Process: Study Of Emotion And Coping During Three Stages Of A College Examination. Journal Of Personality And Social Psychology, 48,(1), 150-170.

Fox, RJ. Crask, MR. and Kim, J. (1988). Mail Survey Response Rate: A Meta - Analysis Of Selected Techniques For Inducing Response. Public Opinion Quarterly, 52, 467 - 491.

Francis, W. (1960). The Onset Of Stress Incontinence. Journal Of Obstetrics And Gynaecology of the British Empire, 67, 899-903.

Frazer, MI. Haylen, BT. and Sutherst, JR. (1989) The Severity Of Urinary Incontinence In Women: Comparison Of Subjective And Objective Tests. British Journal of Urology, 63, 14-15.

Gilpin, SA. Gosling, JA. Smith, ARB. and Warrell, DW. (1989). The Pathogenesis Of Genitourinary Prolapse And Stress Incontinence Of Urine. A Histological And Histochemical Study. British Journal Of Obstetrics and Gynaecology, 96, 15-23.

Glazener, CMM. Abdalla, M. Stroud, P. Maji, S. Templeton, A. and Russell, AT. (1995). Postnatal Maternal Morbidity: Extent, Causes, Prevention And Treatment. British Journal Of Obstetrics And Gynaecology, 102, 282-287.

Goldstein, M. Hawthorne, ME. Engberg, S. McDowell, BJ. and Burgio, K. (1992). Urinary Incontinence: Why People Do Not Seek Help. Journal Of Gerontological Nursing, April, 15-20.

Gordon, H. and Logue, M. (1985). Perineal Muscle Function After Childbirth. The Lancet, July 20th, 123-125.

Gosling. (1979). The Structure Of The Bladder And Urethra In Relation To Function. Urology Clinics Of North America, 6, 31-38

Griffin, C. Dougherty, MC. and Yarandi, H. (1994). Pelvic Muscles During Rest: Responses To Pelvic Muscle Exercise. Nursing Research, 43(3), 164-167.

Guba, EG. and Lincoln, YS. (1981). Effective Evaluation. San Francisco: Jossey-Bass.

Haase, JE. and Myers, ST. (1988). Reconciling Paradigm Assumptions Of Qualitative and Quantitative Research. Western Journal of Nursing Research, 10(2), 128-137.

Hahn, I. Milsom, I. Fall, M. and Ekelund, P. (1993). Long -term Results Of Pelvic Floor Training In Female Stress Urinary Incontinence. British Journal of Urology, 72, 421-427.

Hahn, I. and Milsom, I. (1996). Treatment Of Female Stress Urinary Incontinence With A New Anatomically Shaped Vaginal Device. British Journal Of Urology, 77, 711-715.

Haken, J. Benness, C. Cardozo, L. and Cutner, A. (1991). A Randomized Trial Of Vaginal Cones And Pelvic Floor Exercises In The Management Of Genuine Stress Incontinence. Neurology and Urodynamics, 10, 393-394.

Hancock, A. (1994). How Effective Is Antenatal Education? Modern Midwife, 4(5), 13-15.

Harrison, SCW. Brown, C. and O'Boyle, PJ. (1993). Periurethral Teflon For Stress Urinary Incontinence: Medium Term Results. British Journal Of Urology, 71, 25-27.

Haylen, BT. Sutherst, JR. and Frazer, MI. (1989). Is The Investigation Of Most Stress Incontinence Really Necessary? British Journal Of Urology, 64, 147-149.

Haynes, RB. Haywood, RS. and Lomas, J. (1995). Evidence Based Medicine. Journal of American Medical Information Association, 2, 342-350.

Henalla, SM. Kirwan, P. Casteleden, CM. Hutchins, CJ. and Breeson, AJ. (1988). The Effect Of Pelvic Floor Exercises In The Treatment of Genuine Urinary Stress Incontinence In Women at Two Hospitals. British Journal Of Obstetrics and Gynaecology, 95, 602-605.

Henderson, JS. (1983). Effects Of A Prenatal Teaching Programme On Postpartum Regeneration Of The Pubococcygeal Muscle. Journal Of Obstetrics, Gynecology and Neonatal Nursing, Nov/Dec, 403-408.

Henderson, J. and Taylor, K. (1987). Age As A Variable In An Exercise Programme For The Treatment Of Simple Stress Incontinence. Journal Of Obstetrics, Gynaecology In Neonatal Nursing, 16, 266-272.

Hendrickson, L. (1981). The Frequency Of Stress Incontinence In Women Before And After The Implementation Of An Exercise Programme. Issues In Health Care, 11(1): 3: 81-92.

- Hesse, U. Vodusek, DB. Deindle, FM. Lukanovic, A. and Schuessler, B. (1991)
Neurophysiological Assessment Of Treatment With Vaginal Cones. Neurourology and Urodynamics, 10, 394-395.
- Hoinville, G. and Jowell, R. (1977). (eds) Survey Research Practice. Heinemann: London.
- Holst, K. and Wilson, PD. (1988). The Prevalence Of Females Urinary Incontinence And Reasons For Not Seeking Treatment. New Zealand Medical Journal, November 9, 756-758.
- Horowitz, MJ. (1974). Stress Response Syndromes. Archives Of General Psychiatry, 31, 768-781.
- Houston, M. and Weatherston, L. (1986). Creating Change In Midwifery: Integrating Theory And Practice Through Practice-Based Research Groups. Midwifery, 2, 65-70.
- Hunskar, S. and Visnes, A. (1991). The Quality Of Life In Women With Urinary Incontinence As Measured By The Sickness Impact Profile. Journal of American Geriatric Society, 39, 378-82.
- Iosif, S. (1981) Stress Incontinence During Pregnancy and Puerperium. International Journal of Gynaecology and Obstetrics, 19, 13-20.
- Jeffcoate, T. and Roberts, H. (1952). Observations On Stress Incontinence Of Urine. American Journal of Obstetrics and Gynaecology, 64, 721-738.

Jensen, JK. Neilsen, FR. and Ostergaard, DR. (1991). The Role Of The Patient History In The Diagnosis Of Urinary Incontinence. Obstetrics and Gynecology, 83, 904-910.

Jolleys, JV. (1988). Reported Prevalence Of Urinary Incontinence In Women In A General Practice. British Medical Journal, 296, 1300-1302.

Jonasson, A. Larsson, B. and Pschera, H. (1989). Testing and Training Of The Pelvic Floor Muscles After Childbirth. Acta Obstetrica Gynaecologia Scandinavica, 68, 301-304.

Jones, P. (1990). Implications For Practice. (in) Murphy-Black, T. and Faulkner, A.(eds) Midwifery. Scutari.

Kegal, AH. (1948). Progressive Resistance Exercise In The Functional Restoration Of The Perineal Muscles. American Journal Of Obstetrics And Gynecology, 56(2), 238-248.

Kitzinger, S. (1975). Some Mothers' Experience Of Induced Labour. National Childbirth Trust: London.

Kujansuu, E. (1983). The Effect Of Pelvic Floor Exercises On Urethral Function In Female Stress Urinary Incontinence: A Urodynamic Study. Annales Chirurgiae et Gynaecologiae, 72, 28-32.

Kvale, S. (1996). Interviews: An Introduction To Qualitative Research Interviewing, Sage: Thousand Oaks.

Lagro-Janssen, ALM. Debruyne, FMJ. Smits, AJA. and Van Weel, C. (1991). Controlled Trial Of Pelvic Floor Exercises In The Treatment Of Urinary Stress Incontinence In General Practice. British Journal of General Practice, 41, 445-449.

Lagro-Janssen, T. Smits, A. and Van Weel, C. (1992). Urinary Incontinence In Women And The Effects On Their Lives. Scandinavian Journal Of Primary Health Care, 10, 211-216.

Lam, GW. Foldspang, A. Elving, LB. and Mommsen, S. (1992). Social Context, Social Abstention And Problem Recognition Correlated With Adult Female Urinary Incontinence. Danish Medical Bulletin, 39, 565-570.

Landon, CR. Crofts, CC. Smith, ARB. and Trowbridge, EA. (1990). Mechanical Properties Of Fascia During Pregnancy. A Possible Risk Factor In The Development Of Stress Incontinence Of Urine. Contemporary Review in Obstetrics and Gynecology, 2, 108-109.

Laycock, J. (1987). Graded Exercises For The Pelvic Floor Muscles In The Treatment Of Urinary Incontinence. Physiotherapy, 73(7), 371-373.

Laycock, J. (1997). Physiotherapy Assessment Of The Pelvic Floor. Proceedings Of The 4th Biennial Pelvic Floor Conference. Harrogate. December 1 - 2.

Laycock, J. and Green, RJG. (1988). Interferential Therapy In The Treatment Of Incontinence. Physiotherapy, 74, 161-168.

Lawson, JON. (1974). Pelvic Anatomy I. Pelvic Floor Muscles. Annals of Royal College Of Surgeons, 54, 244-252.

Lazarus, RS. and Folkman, S. (1984). Stress, Appraisal And Coping, Springer: New York.

Ledward, RS. Hawkins, DF. (1983). Drug Treatment In Obstetrics, Chapman Hall: London.

Lipman, A. (1968). A Socio-architectural View Of Life In Three Homes For Old People. Gerontologica Clinica, 10, 88-91.

Litwin, MS. (1995). How To Measure Survey Reliability And Validity, Sage: Beverley Hills.

Lumley, J. and Brown, S. (1993). Attenders and Non-Attenders At Childbirth Education Classes in Australia: How do They And Their Births Differ. Birth: Issues In Perinatal Care, 20(3), 123-130.

MacArthur, C. Lewis, M. and Bick, D. (1993). Stress Incontinence After Childbirth. British Journal of Midwifery 1(5), 207-213.

Macaulay, AJ. Stern, RS. Holmes, DM. and Stanton, SL. (1987). Micturition And The Mind: Psychological Factors In The Aetiology And Treatment Of Urinary Symptoms In Women. British Medical Journal, 294, 540-543.

Maheux, B. Legault, C. and Lambert, J. (1989). Increasing Response Rates In Physicians' Mail Surveys: An Experimental Study. American Journal of Public Health, 79, 638-639.

Mahoney, CA. Thombs, DL. and Howe, CZ. (1995). The Art And Science Of Scale Development In Health Education Research. Health Education Research, 10(1), 1-10.

Maly, BD. (1980). Rehabilitation Principles In The Care Of Gynecologic and Obstetric Patients. Archives of Physical Medicine Rehabilitation, 61, 79-81.

Mattox, TF. and Bhatia, NN. (1996). The Prevalence Of Urinary Incontinence Or Prolapse Among White And Hispanic Women. American Journal Of Obstetrics and Gynecology, 174, 646-648.

May, T. (1993). Social Research: Issues, Methods and Process, Open University Press: Buckingham.

Meyer, S. Schreyer, A. DeGrandi, P. and Hohlfield, P. (1998). The Effects Of Birth On Urinary Continence Mechanisms and Other Pelvic Floor Characteristics. Obstetrics And Gynecology, 4(1), 613-618.

Miller, J, Ashton-Miller, J DeLancey, JOL. (1996). The Knack: Use of Precisely Timed Pelvic Muscle Contraction Can Reduce Leakage In Stress Urinary Incontinence. Neurourology and Urodynamics, 15, 392-393.

Miller, J. Kasper, C. and Sampselle C. (1994). Review Of Muscle Physiology With Application To Pelvic Muscle Exercise. Urologic Nursing, 14(3), 92-97.

Milley, P. and Nichols, D. (1971). The Relationship Between The Pubo-urethral Ligaments And The Urogenital Diaphragm In The Human Female. Anatomical Records, (170), 281-284.

Milne, JS. (1976). Prevalence of Incontinence In The Elderly Age Groups. (In) Willington FL (ed). Incontinence And The Elderly. Academic Press: London.

Miodrag, A. Castleden, CM. and Vallance, TR. (1988). Sex Hormones and The Female Urinary Tract. Drugs, 36, 491-504.

Mitchell, ES. (1986). Multiple Triangulation: A Methodology For Nursing Science. Advances In Nursing Science, 8 (3), 18-26.

Mittelmark, RA. Wiswell, RA. and Drinkwater, BL. (1991). Exercise In Pregnancy. Williams and Wilkins: Baltimore.

Mitteness, LS. (1990). Knowledge And Belief About Urinary Incontinence In Adulthood And Old Age. Journal Of American Geriatrics Society, 38 (3), 374-378.

Moir, DD. (1989). Pain Relief In Labour: A Handbook For Midwives, Churchill Livingstone: London.

Monga, AK. Robinson, D. and Stanton, SL. (1995). Periurethral Collagen Injections For Genuine Stress Incontinence: A Two Year Follow Up. British Journal Of Urology, 76, 156-160.

MORI. (1991). Survey of Attitudes and Prevalence of Incontinence. For British Association of Continence Care. MORI Health Research Unit.

Morkved, S. Bo, K. (1996). The Effect Of Pelvic Muscle Exercises To Strengthen The Pelvic Floor Muscles. Acta Obstetrica Gynecologica Scandinavica, 75, 382-385.

Morse, JM. (1991). Approaches To Qualitative - Quantitative Methodological Triangulation. Nursing Research, 40(1), 120-122.

Mouritsen, L. Frimodt-Moller, C. and Moller, M. (1991). Long Term Effect Of Pelvic Floor Exercises On Female Urinary Incontinence. British Journal Of Urology, 68, 32-37.

Mundy, A. (1984). Clinical Physiology Of The Bladder, Urethra And Pelvic Floor. in Mundy, A. Stephenson, T. and Weir, A. (eds) Urodynamics: Principles, Practice And Application, Churchill Livingstone: London.

Nederhof, AJ. (1983). Effects Of Repetition And Consistency Of Personalization Treatments On Response Rate In Mail Surveys. Social Science Research, 12, 1-9.

Nielsen, CA. Sigsgaard, I. Olsen, M. Tolstrup, M. Danneskiold-Samsoee, B. and Bock, JE. 1988. Trainability Of The Pelvic Floor: A Prospective Study During Pregnancy And After Delivery. Acta Obstetrica Gynaecologica Scandinavica, 67, 437-440.

Noelker, LS. (1987). Incontinence In Elderly Cared For By Family. Gerontologist 27, 194-197.

Nolan, M. (1994). A Comparison Of Attenders At Antenatal Classes In The Voluntary And Statutory Sectors: Education And Organisational Implications. Midwifery, 11, 138-145.

Norton, C. (1982). The Effects Of Urinary Incontinence In Women. International Rehabilitation Medicine, 4, 9-14.

Norton, PA. MacDonald, LD. Sedgwick, PM. and Stanton, SL. (1988). Distress And Delay Associated With Urinary Incontinence, Frequency, And Urgency In Women. British Medical Journal, 297, 1187-1189.

Norton, P. (1994). Aims of Pelvic Floor Re-education : (in) Schussler B, Laycock J, Norton P, Stanton S (eds). Pelvic floor Re-Education: Principles and Practice. London: Springer - Verlag.

O'Brien, M. and Smith, C. (1981). Women's Views And Experiences Of Antenatal Care. The Practitioner, 224, 123-125.

Olah, KS. Bridges, N. Denning, J. and Farrar, DJ. (1990). The Conservative Management Of Patients With Symptoms Of Stress Incontinence. A Randomized, Prospective Study Comparing Weighted Vaginal Cones And Interferential Therapy. American Journal Of Obstetrics And Gynecology, 162, 87-92.

Oppenheim, AN. (1992). Design, Interviewing And Attitude Measurement, Pinter: London.

Pachulski, RT. (1990). Obstetrics and Gynaecology Notes. Prentice Hall: London.

Patton, MQ. (1990). Qualitative Evaluation Methods, Sage. London.

Plevnik, S. Janez, J. Vrtacnik, P. Trsinar, B. and Vodusek, DB. (1986). Short Term Electrical Stimulation: Home Treatment For Urinary Incontinence. World Journal Of Urology, 4, 24-26.

Pomerance, JJ, Gluck, L. and Lynch, VA. (1974). Physical Fitness In Pregnancy: Its Effect On Pregnancy Outcome. American Journal Of Obstetrics And Gynecology, 119 (7), 867-875.

Rekers, H. Drogendijk, AC. ValKenburg, H. and Riphagen, F. (1992). Urinary Incontinence In Women From 35 - 79 Years Of Age: Prevalence And Consequences. European Journal Of Obstetrics, Gynecology and Reproductive Biology, 43, 229-34.

Reymert, J. and Hunskaar, S. (1994). Why Do Only A Minority Of Perimenopausal Women With Urinary Incontinence Consult A Doctor? Scandinavian Journal Of Primary Health Care, 12, 180-183.

Rist. (1977). On The Relations Among Educational Research Paradigms: From Disdain To Detente. Anthropology and Education Quarterly, 8(2), 29-42.

Roberts, J and Wooley, D. (1996). A Second Look At The Second Stage of Labour. Journal of Gynecology and Neonatal Nursing, 25 (5), 415-421.

Robson, C. (1993). Real World Research: A Resource For Social Scientists and Practitioner-Researchers, Blackwell: Oxford.

- Rockner, G. (1990). Urinary Incontinence After Perineal Trauma At Childbirth. Scandinavian Journal of Caring Science, 4 (4), 169-172.
- Rotter, JB. (1966). Generalised Expectancies For Internal Versus External Control of Reinforcement. Psychological Monographs- General and Applied, 80
- Roszkowski, MJ. and Bean, AG. (1990). Believe It Or Not! Longer Questionnaires Have Lower Response Rates. Journal of Business Psychology, 4 (4), 495-509.
- Rud, T. (1980). The Effects Of Oestrogens And Gestagens On The Urethral Pressure Profile In Urinary Continent And Stress Incontinent Women. Acta Obstetrica Gynaecologica Scandinavica, 59, 265-270.
- Sampsel, C. and DeLancey, JOL. (1988). Anatomy Of Female Continence. Journal Of Western Ostomy and Continence Nurses Society, 25(2), 63-74.
- Sampsel, C. Miller, JM. Mims, B. DeLancey, JOL. Ashton-Miller, JA. Antonakos, CL. (1988). Effect Of Pelvic Muscle Exercise On Transient Incontinence During Pregnancy And After Birth. Obstetrics and Gynecology, 91(3), 406-411.
- Samuelson, E. Victor, A. and Tibblin, G. (1997). A Population Study Of Urinary Incontinence And Nocturia Among Women Aged 20 - 59 Years: Prevalence, Wellbeing and Wish For Treatment. Acta Obstetrica Gynecologica Scandinavica, 76, 74-80.
- Sandelowski, M. (1986). The Problem of Rigor In Qualitative Research. Advances In Nursing Science, 8(3), 27-37.

Sandri, SD. Biggiogero, L. Fanciullacci, F. and Zonollo, A. (1990). Long Term Follow Up Results Of Pelvic Floor Rehabilitation In Female Stress Urinary Incontinence. International Urogynecology Journal, 1, 188-190.

Schiff, I. and Ryan, K. (1980). Benefits of Estrogen Replacement. Obstetric and Gynecological Survey, 35(6), 400-411.

Shepherd, AM. Montgomery, E. and Anderson, RS. (1983). Treatment Of Genuine Stress Incontinence With A New Perineometer. Physiotherapy, 69, 113.

Siemiatycki, J. (1979). A Comparison of Mail, Telephone And Home Interview Strategies For Household Health Surveys. American Journal of Public Health, 69, 238-245.

Simons, J. (1985). Does incontinence Affect Your Clients Self Concept? Journal Of Gerontological Nursing, 11(6), 37-42.

Singer, E. Hippler, HJ. and Schwarz, N. (1992). Confidentiality Assurances In Surveys: Reassurance Or Threat?. International Journal Of Public Opinion, 4, 256-268.

Skoner, M. Thompson, WD. and Caron, V. (1994). Factors Associated With Risk Of Stress Urinary Incontinence In Women. Nursing Research, 43(5), 301-306.

Sleep, JM. Grant, A. Garcia, J. Liberman, D. Spencer, J. and Chalmers, I. (1984). West Berkshire Perineal Management Trial. British Medical Journal, 289, 587-590.

Sleep, J. and Grant, A. (1987). Pelvic Floor Exercises In Postnatal Care. Midwifery, 3, 158-164.

Smith, JK. (1983). Quantitative Versus Qualitative Research: An Attempt To Clarify The Issue. Educational Researcher, March, 6-13.

Smith, ARB. Hosker, GL. and Warrell, DW. (1989a). The Role Of Pudendal Nerve Damage In The Aetiology Of Genuine Stress Incontinence In Women. British Journal of Obstetrics and Gynaecology, 96, 29-32.

Smith, ARB. Hosker, GL. and Warrell, DW. (1989b). The Role Of Partial Denervation Of The Pelvic Floor In The Aetiology Of Genitourinary Prolapse And Stress Incontinence Of Urine. A Neurophysiological Study. British Journal Of Obstetrics And Gynaecology, 96, 24-28.

Snooks, SJ. Badenoch, Tiptaft, RC. Swash, M. (1985). Perineal Nerve Damage In Genuine Stress Urinary Incontinence: An Electrophysiological Study. British Journal Of Urology, 57, 422 - 426.

Snooks, SJ. Barnes, PRH. and Swash, M. (1984). Damage To The Innervation Of The Voluntary Anal And Periurethral Sphincter Musculature In Incontinence: An Electrophysiological Study. Journal Of Neurology, Neurosurgery, And Psychiatry, 47, 1269-1273

Snooks, SJ. Setchell, M. Swash, M. and Henry, MM. (1984). Injury To Innervation Of Pelvic Floor Sphincter Musculature In Childbirth. The Lancet, Sept 8, 546-560.

Snooks, SJ. and Swash, M. (1984). Perineal Nerve And Transcutaneous Spinal Stimulation: New Methods For Investigation Of The Urethral Striated Sphincter Musculature. British Journal Of Urology, 56, 406-409.

Snooks, SJ. Swash, M. Mathers, SE. and Henry, MM. (1990). The Effect Of Vaginal Delivery On The Pelvic Floor: A Five Year Follow Up Study. British Journal Of Surgery, 77, 1358-1360.

Sorrell, JM. and Redmond, GM. (1995). Interviews In Qualitative Nursing Research: Differing Approaches For Ethnographic And Phenomenological Studies. Journal Of Advanced Nursing, 21, 1117-1122.

Stanton, SL. Kerr-Wilson, R. and Grant Harris, V. (1980). The Incidence Of Urological Symptoms In Normal Pregnancy. British Journal Of Obstetrics and Gynaecology, 87, 897-900.

Staskin, D. Zimmern, P. Hadley, R. and Raz, S. (1985). Pathophysiology Of Stress Incontinence. Clinics in Obstetrics and Gynecology, 12 (2), 357-367.

Stoddart, G. (1983). Research Project Into The Effect Of Pelvic Floor Exercises On Genuine Stress Incontinence. Physiotherapy, 69, 148-149.

Strickland, BR. (1978). Internal - External Expectancies And Health Related Behaviours. Journal of Consulting And Clinical Psychology, 46, 1192-1211.

Suarez, GM. Baum, NH. and Jacobs, J. (1991). Use Of Standard Contraceptive Diaphragm In Management Of Stress Urinary Incontinence. Urology, 37, 119- 122.

Sultan, AH, Kamm, MA. and Hudson, CN. (1994). Pudendal Nerve Damage During Labour: Prospective Study Before And After Childbirth. British Journal Of Obstetrics And Gynaecology, 101, 22-28.

Susset, JG. Galea, G. and Read, L. (1990). Effects Of Biofeedback And Urinary Stress Incontinence Due To Low Urethral Resistance. Journal Of Urology, 143, 1205-1208

Tabachnick, BG. and Fidell, LS. (1996). Using Multivariate Statistics, Harper Collins: London.

Tampakoudis, P. Tantanassis, T. Grimbizis, G. Papaletsos, M. and Mantalenakis, S. (1995). Cigarette Smoking And Urinary Incontinence In Women - A New Calculative Method Of Estimating The Exposure To Smoke. European Journal of Obstetrics and Gynecology, 63, 27-30.

Tapp, AJS. Cardozo, L. Hills, B. and Barnick, C. (1988). Who Benefits From Physiotherapy?. Neurourology and Urodynamics, 7, 259-61.

Taylor, KH. and Henderson, JS. (1986). Effects Of Biofeedback On Simple Urinary Stress Incontinence In Old Women. Journal Of Gerontological Nursing, 12, 25-30.

Tchou, D. Adams, C. Varner, RE. and Denton, B. (1988). Pelvic Floor Musculature Exercises In Treatment Of Anatomical Urinary Stress Incontinence. Physical Therapy, 68(5), 652-655.

Tetzschner, T. Sorensen, M. Jonsson, L. Lose, G. and Christiansen, J. (1997). Delivery And Pudendal Nerve Function. Acta Obstetrica Gynecologica Scandinavica, 76, 324-331.

Thomas, TM. Plymat, KR. Blannin, J. and Meade, TW. (1980). Prevalence of Urinary Incontinence. British Medical Journal, 281, 1243-1245.

United Kingdom Central Council For Nursing, Midwives and Health Visitors. (1986). Midwives Code of Practice For Midwives Practising In The UK. London.

Varner, RE. and Sparks, JM. (1991). Surgery For Stress Urinary Incontinence. Surgical Clinics of North America, 71(5), 1111-1133.

Versey, SG. Rivett, A. and O'Boyle, PJ. (1988). Teflon Injection In Female Stress Incontinence. Effects on Urethral Pressure Profile And Flow Rate. British Journal Of Urology, 62, 39-41.

Versi, E. Cardozo, LD. and Anand, D. (1991). Symptoms Analysis For The Diagnosis Of Genuine Stress Incontinence. British Journal of Obstetrics And Gynaecology, 87, 184-190.

Viktrup, L. Lose, MD. Rolff, M. and Barfoed, K. (1992). The Symptoms Of Stress Incontinence Caused By Pregnancy Or Delivery In Primiparas. Obstetrics and Gynecology, 79(6), 945-949.

Vinsnes, AG. and Hunskaar, S. (1991). Distress Associated With Urinary Incontinence As Measured By A Visual Analogue Scale. Scandinavian Journal Of Caring Science, 5, 57-61.

Vodusek, DB. (1997). Electrical Stimulation In The Treatment Of Incontinence. Proceedings Of The 4th Biennial Pelvic Floor Conference. Dec 1-2. Harrogate.

Wall, LL. (1993). The Muscles Of The Pelvic Floor. Clinics in Obstetrics And Gynaecology, 36, 910-925.

Wallace, G. (1967). Blood Loss In Obstetrics Using A Haemoglobin Dilution Technique. Journal of Obstetrics And Gynaecology Of The British Commonwealth, 74, 64-67.

Walters, M. (1989). Mechanisms Of Continence And Voiding With International Continence Society Classification Of Dysfunction. Obstetrics and Gynecology Clinics Of North America, 16(4), 773-785.

Weinman, J. Wright, S and Johnston M. (1995). Measures In Health Psychology: A User's Portfolio. NFER-Nelson: Windsor, UK.

Wilkerson, VA. (1984). The Use of Episiotomy In Normal Delivery. Midwives Chronicle and Nursing Notes, 97, 106-110.

Wilson, M. (1996). Asking Questions. (in) Sapsford, R. and Jupp, V. (eds) Data Collection and Analysis, Sage: London.

Wilson, PD. Herbison, RM. and Herbison, GP. (1996). Obstetric Practice And The Prevalence Of Urinary Incontinence Three Months After Delivery. British Journal of Obstetrics and Gynaecology, 103, 154-161.

Wren, BG. and Lobo, RA. (1989). Handbook Of Obstetrics and Gynaecology, Chapman and Hall Medical: London.

Wyman, JF. Harkins, SW. Choi, SC. Taylor, JR. and Fantl, A. (1987). Psychosocial Impact Of Urinary Incontinence In Women. Obstetrics and Gynecology, 70(3), 378-381.

Zacharin, RF. (1963). The Suspensory Mechanism Of The Female Urethra. Journal of Anatomy, 97(3), 423-427.

Zinner, NN. Sterling, AM. and Ritter, RC. (1980). Role Of Urethral Softness In Urinary Incontinence. Urology 16, 115-117.

Appendices

Contents

Appendix number		page
1	Information sheet	i
2	Consent form	ii
3	Letters accompanying the womens questionnaires	iii
4	Questionnaire 1	vi
	Bladder problems during pregnancy	
5	Questionnaire 2	viii
	Bladder problems after pregnancy	
6	Questionnaire 3	x
	Bladder problems - follow up questionnaire	
7	Invite to interview letter	xii
8	Medical records information sheet	xiii
9	Letter accompanying health professional questionnaire	xv
10	Health professional questionnaire	xvi
11	Methodological considerations of multivariate analysis	`
	and results for non significant findings	xx
12	Additional comments made by health professionals	xxiii
13	Paper accepted for publication by Midwifery	xxvi
14	Paper accepted for publication by Birth: Issues In Perinatal Care	xxvii

RESEARCH STUDY - STRESS INCONTINENCE FOLLOWING CHILDBIRTH

INFORMATION SHEET

I am a researcher working on a joint project in the School of Healthcare at Liverpool John Moores University and St Mary's Hospital. The study is on Stress Incontinence During and After Pregnancy. Stress incontinence occurs when urine leaks during physical activity or on exertion, for example whilst coughing, laughing, climbing stairs, lifting heavy objects etc. Some women will leak just a few drops - enough to dampen their pants, whilst other women lose a lot more urine at such times. Studies have shown us that stress incontinence may occur during and after pregnancy but that it is not often talked about. The information gathered will be used to answer the following questions:

- How many women suffer from this condition during and after pregnancy?
- Why some women have it whilst others do not?
- Are there any ways of preventing it?
- How it affects those women who suffer from it?
- What help they receive?.

We hope this information will lead to improvements in the care given to women both during and after their pregnancy.

I will be asking all women delivering at St Mary's Hospital within a three month period to take part in this study. If you agree, a short questionnaire will be sent to you at your home address when you are about 36 weeks pregnant. A second one will be sent 6 weeks after delivery. They will each take only about 5 minutes to complete. For most women, this is all the help I will need from you.

However, I would like to collect further information from a small sample of women, and it is possible that this will include you. If so, you will be asked to take part in an interview with me which will last about half an hour. Finally, one more questionnaire will be sent a year later. As with the other questionnaire this will take about 5 minutes to complete and a small proportion of this sample will be invited again to take part in a second short interview.

With your permission, we will also collect some details about your pregnancy and birth from your hospital records in order to help us look at some of the possible causes and ways of preventing stress incontinence.

If you do not wish to take part in this study or you want to withdraw at a later stage we will respect your wishes. Whatever you decide, this will not affect your care at the hospital in any way.

All the information you give me will be treated in the strictest of confidence, you will never be identified personally and your details will not be passed on to anyone else.

Appendix 2

Patient Consent Form

I have read the details of the study and agree to participate in it.

I give my permission for the researcher to obtain the necessary information from my medical records.

I understand all the information I have given will be treated in confidence and that I may withdraw at any time . This will not affect my treatment in any way.

.....(please sign your name here)

NAME (PLEASE PRINT):.....

ADDRESS:.....

.....

.....

Linda Mason, Research Student School of Healthcare Liverpool John Moores University L2 2ER
0151 231 4090



Liverpool John Moores University

**School of
Healthcare**



Linda Mason
School of Healthcare
John Moores University
79, Tithebarn Street
Liverpool
L2 2ER

0151 231 4090

Dear

I am writing to you about the research study on Stress Incontinence During and After Pregnancy currently being carried out by Liverpool John Moores University with St. Mary's Hospital. You may recall that I invited you to take part in the study when you attended the hospital at booking.

I would be grateful if you would complete the questionnaire that I have enclosed and post it back to me in the envelope provided. (No stamp is needed). It is important that you reply even if you do not suffer from stress incontinence. I will send the second questionnaire to you about eight weeks after the birth of your baby.

If you have any questions about the research or would like more information please don't hesitate to contact me on the above telephone number or address.

Thank you for your help.

Yours sincerely

Linda Mason

Linda Mason
School of Healthcare
John Moores University
79, Tithebarn Street
Liverpool
L2 2ER

0151 231 4090

Dear

I am writing to you about the research study on stress incontinence which is being carried out by Liverpool John Moores University with Warrington NHS Trust Hospital and St Mary's Hospital, Manchester. I would be grateful if you would complete the second questionnaire which will be used to find out how many women suffer from stress incontinence after giving birth. For the research to be effective it is important that you return it even if you do not suffer from stress incontinence at this time. I have enclosed a freepost envelope for your convenience.

If you have any questions about the research or would like more information please don't hesitate to contact me on the above telephone number or address.

Thank you once again for your help with the research.

Yours sincerely

Linda Mason

Linda Mason
School of Healthcare
Liverpool John Moores University
79, Tithebarn Street
Liverpool
L2 2ER
0151 231 4090

Dear

You may recall taking part in the research being carried out into Stress Incontinence During And After Pregnancy. There has been a very good response to the survey and I would like to thank you for your help.

For the final part of the study I am following up women a year after giving birth in order to find out whether stress incontinence is a long term problem or whether it resolves itself soon after the birth.

I would be therefore be very grateful if you would complete the last questionnaire for me and return it in the envelope provided. (No stamp is needed).

If you have any queries or would like more information about the research please don't hesitate to contact me.

Thank you,

Yours sincerely

Linda Mason

Appendix 4
Bladder Problems During Pregnancy

Please answer the questions by ticking the box which most applies to you.

1. Do you ever leak drops of urine accidentally? (ie; 'wet yourself')

Yes ☐ No ☐

2. Do you leak any urine during physical activity or exertion for example, whilst coughing, laughing, lifting heavy objects, climbing stairs, during sex etc?

Yes ☐ No ☐ If no, please miss out questions 3,4 & 5.

3. How often do you leak urine?

Occasionally ☐
Once a week ☐
Several times per week ☐
Daily ☐

4. Do you ever need to wear a sanitary towel or change your underwear for this reason?

No ☐
Occasionally ☐
Always when exercising ☐
Most or every day ☐

5. When did the leakage of urine first begin?

Since giving birth this time? ☐
During this pregnancy ☐
During or soon after a previous pregnancy ☐
Before ever becoming pregnant ☐
Some other time ☐

6. In the 12 months before you became pregnant, how often did you usually exercise each week? (include only periods of 20 minutes or more)

Less than once per week ☐
Once a week ☐
2 - 3 times a week ☐
4 - 6 times a week ☐
Daily ☐

7. Since becoming pregnant have you been given any information or instruction on pelvic floor exercises?

Yes ☐ No ☐ If no: please miss out questions 8 9 & 10

8. Were you given this information or instruction at antenatal classes?

Yes ☐ No ☐

9. Who gave you the information or instruction? Please tick as many as apply

Midwife ☐
GP ☐
Physiotherapist ☐
Nurse (at the health centre / GP practice) ☐
Nurse (at the hospital) ☐
Other (please specify) ☐
.....

10. How was the information or instruction given to you? Please tick as many as apply

Brief mention or reminder to do them ☐
Leaflet / written instruction or drawn diagram ☐
Verbal instruction ☐
Physical instruction / demonstration ☐

Please Turn Over >

11. Do you ever do pelvic floor exercises?

Yes ☐

No

☐ If no, please miss out questions 12 & 13.

12. When did you first start to do pelvic floor exercises?

Before you became pregnant

☐

In the first 3 months of pregnancy

☐

Between 4 and 6 months of pregnancy

☐

Between 7 and 9 months of pregnancy

☐

13. How often do you exercise the pelvic floor?

Occasionally

☐

Once a week

☐

Several times a week

☐

Daily

☐

If daily: -

How many times per day do you manage to do a group of contractions?

1 - 2

☐

3 - 4

☐

More than 4

☐

Thank you for your help with the research. Please return this form to me in the envelope provided.

☐☐☐☐☐

Appendix 5
Bladder Problems After Pregnancy

Please answer the questions by ticking the box which most applies to you.

1. Do you ever leak drops of urine accidentally? (ie; 'wet yourself')

Yes ☐ No ☐

2. Do you leak any urine during physical activity or exertion for example, whilst coughing, laughing, lifting heavy objects, climbing stairs, during sex etc?

Yes ☐ No ☐ If no, please miss out questions 3,4 & 5.

3. How often do you leak urine?

Occasionally ☐
Once a week ☐
Several times per week ☐
Daily ☐

4. Do you ever need to wear a sanitary towel or change your underwear for this reason?

No ☐
Occasionally ☐
Always when exercising ☐
Most or every day ☐

5. When did the leakage of urine first begin?

Since giving birth this time? ☐
During this pregnancy ☐
During or soon after a previous pregnancy ☐
Before ever becoming pregnant ☐
Some other time ☐

6. Since giving birth, have you been given any information or instruction on pelvic floor exercises?

Yes ☐ No ☐ If no: please miss out questions 7 & 8.

7. Who gave you the information or instruction? Please tick as many as apply

Midwife ☐
GP ☐
Health visitor ☐
Physiotherapist ☐
Nurse (at the health centre / GP practice) ☐
Nurse (at the hospital) ☐
Other (please specify) ☐
.....

8. How was the information or instruction given to you? Please tick as many as apply

Brief mention or reminder to do them ☐
Leaflet / written instruction or drawn diagram ☐
Verbal instruction ☐
Physical instruction / demonstration ☐

9. Do you ever do pelvic floor exercises?

Yes ☐ No ☐ If no, please miss out questions 10 & 11.

10. When did you first start to do pelvic floor exercises?

Before you became pregnant this time ☐
In the first 3 months of pregnancy ☐
Between 4 and 6 months of pregnancy ☐
Between 7 and 9 months of pregnancy ☐

Please Turn Over >

Bladder Problems -Follow Up Questionnaire

Whilst you may have had the following symptoms in the past these questions refer to your present condition only. Please answer the questions by ticking the box which best applies to you.

1. Do you ever leak drops of urine accidentally? (ie; 'wet yourself')

Yes ☐ No ☐

2. Do you leak any urine during physical activity or exertion for example, whilst coughing, laughing, lifting heavy objects, climbing stairs, during sex etc?

Yes ☐ No ☐

*If you have answered 'no' to question 2 please miss out questions 3, 4 & 5 then carry on.
If you have answered 'yes' to question 2 please complete questions 3, 4 & 5 then go to question 6.*

3. How often do you leak urine?

Less than once per week ☐
Once a week ☐
Several times per week ☐
Daily ☐

4. Do you ever need to wear a sanitary towel for this reason?

No ☐
Occasionally ☐
Always when exercising ☐
Most or every day ☐

5. Do you ever need to change your underwear for this reason?

No ☐
Occasionally ☐
Always when exercising ☐
Most or every day ☐

6. When did you stop leaking urine?

Within 6 weeks after delivery (ie before your post natal check up) ☐
Between 6 weeks and 3 months after delivery ☐
Between 4 and 6 months after delivery ☐
More than 6 months after delivery ☐

7. In the last 12 months have you sought or received any medical advice or help for this condition?

Yes ☐ No ☐

*If you have answered 'no' please go to question 13
If you have answered 'yes' please carry on.:*

8. In the last 12 months who did you first receive help or advice from? Please tick one answer

Community Midwife ☐
Midwife at the hospital ☐
Health Visitor ☐
Nurse at the health centre / GP practice ☐
GP ☐
Physiotherapist ☐
Other (Please specify).....

Please Turn Over >

9. Were any of the following discussed with the person ticked above?

- Stopping flow of urine ☐
Pelvic floor exercises ☐
Vaginal cones ☐
Interferential therapy ☐
Operation ☐
Other (Please specify).....

10. Did this person refer you on to see someone else?

Yes ☐ No ☐ If no : Please go to question13.

11. Who were you referred to? Please tick one answer only

- Community Midwife ☐
Midwife at the hospital ☐
Health Visitor ☐
Nurse at the health centre / GP practice ☐
GP ☐
Physiotherapist ☐
Continence Adviser ☐
Doctor / Consultant at the hospital ☐
Other (Please specify).....

12. Were any of the following discussed with you by the person ticked in question 11.

- Stopping flow of urine ☐
Pelvic floor exercises ☐
Vaginal cones ☐
Interferential therapy ☐
Operation ☐
Other (Please specify).....

13. Do you ever do pelvic floor exercises?

- Yes ☐
No ☐
No but have done them in the past ☐

If you answered 'yes'.

When did you first start to do pelvic floor exercises?

- Before your last pregnancy ☐
During your last pregnancy ☐
Since giving birth ☐

If you ticked 'since giving birth': Was it.....

- Within 6 weeks after delivery (ie before your post natal check up) ☐
Between 6 weeks and 3 months after delivery ☐
Between 4 and 6 months after delivery ☐
More than 6 months after delivery ☐

How often do you do them?

- Occasionally ☐
Once a week ☐
Several times a week ☐
Daily ☐

If you answered daily:How many times per day do you manage to do a group of pelvic floor exercises?

- 1 - 2 ☐
3 - 4 ☐
More than 4 ☐

Thank you for your help. Please return this form to me in the envelope provided.

☐☐☐☐☐

Appendix 7

Linda Mason
School of Healthcare
Liverpool John Moores University
79, Tithebarn Street
Liverpool
L2 2ER
0151 231 4090

Dear

Thank you very much for returning the final questionnaire to me. I am writing again to ask if you would be willing to take part in a second short (informal!) interview with me for the research study. The interview usually takes around 15 minutes and I would be happy to visit you at a day and time of your convenience.

I am collecting information similar to that in the first interview but concentrating on the services, and womens needs, in the longer term after having a baby.

It is hoped that findings from the interviews, along with the results from a survey of health professionals which is currently underway, will be used to help to improve the services for women in the future.

I have enclosed a brief form for you to fill in (with freepost envelope) so that you can either let me know when you might be available, or that you do not wish to take part.

I look forward to hearing from you.

Yours sincerely

Linda Mason

Data Sheet - Maternal and Obstetric Data**NAME:****CODE NO:****D.O.B:****ETHNIC GROUP:**

1 WHITE EUROPEAN

2 WHITE OTHER

3 BLACK AFRICAN

4 BLACK CARRIBEAN

5 BLACK OTHER

6 INDIAN

7 PAKISTANI

8 BANGLADESHI

9 ORIENTAL

10 MEDITERRANEAN

11 NOT STATED

12 ANY OTHER ETHNIC 13

MORE THAN ONE GROUP

SMOKING HABITS:

1 NON SMOKER

2 LIGHT SMOKER (1-9)

3 MEDIUM (10-19)

4 20+ PER DAY

PARITY (multiple pregnancies count as one):**NUMBER OF PREVIOUS CAESAREANS:****LAST BABY WEIGHT (gms)****LABOUR ONSET**

1 NONE

2 SPONTANEOUS

3 INDUCTION

AUGMENTATION

1 YES

2 NO

ANALGESIA - LABOUR

1 INHALATION (ETONOX)

2 PETHIDINE

3 EPIDURAL

4 G.A.

5 CSE

6 LOCAL INHALATION

7 PUDENDAL BLOCK

8 NONE

9 OTHER

ANALGESIA - DELIVERY

1

2

3

4

5

6

7

8

9

PYREXIA > 38 IN LABOUR

1 YES

2 NO

BLOOD LOSS (ml)**PERINEUM**

1 INTACT

2 FIRST DEGREE

3 EPISIOTOMY

4 SECOND

5 THIRD

NON PERINEAL TEAR

1 YES

2 NO

MANUAL REMOVAL

1 YES

2 NO

TEAR SUTURED

1 YES

2 NO

VERSION DURING LABOUR*1 YES**2 NO***BIRTH WEIGHT (gms)****PRESENTATION AT DELIVERY***1 VERTEX**2 BREECH**3 OTHER CEPHALIC**4 OTHER***METHOD OF DELIVERY***1 SPONTANEOUS**2 EMERGENCY CAES**3 LIFT OUT FORCEPS**4 PLANNED CAES**5 ROTATIONAL FORCEPS**6 ASSISTED BREECH**7 OTHER FORCEPS**8 BREECH EXTN**9 VENTOUSE***PERSON CONDUCTING DELIVERY***1 MIDWIFE (HOSP)**2 HOSP DR**3 G.P.**4 COMMUNITY MID**5 AGENCY MID**6 UNATTENDED**7 OTHER***HAEMOGLOBIN****BIRTH HEAD CIRCUMFERENCE (cms)****FEEDING AT DISCHARGE***1 BREAST**2 ARTIFICIAL**3 SUPPLEMENTED***AGE AT DELIVERY****DURATION OF LABOUR:****FIRST STAGE****SECOND STAGE****TOTAL****BIRTH WEIGHT PERCENTILE**

Appendix 9

Linda Mason
Postgraduate Researcher
School of Health
Liverpool John Moores University
79, Tithebarn Street
Liverpool
L2 2ER

0151 231 4090

Research Study: Stress Incontinence During and After Pregnancy

The School of Health at Liverpool John Moores University is conducting a 3 year study looking at stress incontinence during and after pregnancy.

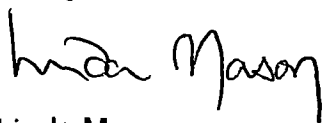
As part of the study a short questionnaire is being sent to a range of health professionals who are involved in the care of women during pregnancy and following delivery. The questionnaire will collect data about the information and care available to women at risk of, or suffering from stress incontinence. It also seeks information on the teaching of pelvic floor exercises.

I will therefore be very grateful if you could complete the questionnaire and return it to me in the freepost envelope provided. The questionnaire should not take more than a few minutes of your time. All information is treated as confidential. If you feel the questionnaire is inappropriate to your work please return the blank questionnaire so that we are aware of this.

If you have any questions, or would like more information about the study, please don't hesitate to contact me at the above address or telephone number.

Thank you for your help.

Yours sincerely

A handwritten signature in black ink that reads "Linda Mason". The signature is written in a cursive style with a large, stylized 'L' and 'M'.

Linda Mason

Stress Incontinence: Care During And After Pregnancy

1. Please state your full job title.

.....

2. If you have a joint appointment eg Practice Nurse, do you give midwifery care?

Yes ☐ No ☐

3. At what stage during pregnancy or the puerperium do women come under your care?

booking clinic	<input type="checkbox"/>
antenatal class	<input type="checkbox"/>
antenatal care	<input type="checkbox"/>
at the time of delivery	<input type="checkbox"/>
early postnatal - up to 10 days postpartum	<input type="checkbox"/>
late postnatal - 10 days postpartum and after	<input type="checkbox"/>
varying stages	<input type="checkbox"/>

4. As part of your normal care do you ask each woman whether she is suffering from any symptoms of stress incontinence?

Yes ☐ Sometimes ☐ No ☐

If yes: When do you usually do this?

During pregnancy ☐ After pregnancy ☐

5. What is your usual course of action if a woman reports having symptoms of stress incontinence? *(please tick as many as applicable)*

Referral to another health professional	<input type="checkbox"/>
Inform / advise on the following:	
a) anatomy of pelvic floor	<input type="checkbox"/>
b) causes of condition	<input type="checkbox"/>
c) diet	<input type="checkbox"/>
d) general exercise	<input type="checkbox"/>
e) pelvic floor exercises	<input type="checkbox"/>
f) other methods of treatment	<input type="checkbox"/>
Provide detailed instruction / treatment using the following:	
a) pelvic floor exercises	<input type="checkbox"/>
b) interferential therapy	<input type="checkbox"/>
c) faradism	<input type="checkbox"/>
d) vaginal devices eg urethral plug	<input type="checkbox"/>
e) vaginal cones	<input type="checkbox"/>
f) surgery	<input type="checkbox"/>
Other <i>(please specify)</i>	

6. Are you satisfied with the course of action you are able to offer?

Yes ☐ No ☐

If no: Why are you dissatisfied? (please tick as many as applicable)

- Lack of time to spend with women ☐
- Lack of knowledge regarding sources of referral ☐
- Lack of information / training (given to yourself) ☐
- Lack of informative material to give out to women ☐
- Lack of equipment to use in treating the condition ☐
- Other (Please specify)

.....

.....

.....

7. With respect to your position within the profession, do you feel the course of action you are able to offer could be improved in any way?

Yes ☐ No ☐

If yes: How could it be improved? (please specify)

.....

.....

.....

Do you know of any reason/s why you are currently unable to offer the improvements you have suggested?

Yes ☐ No ☐

If yes: What are these reasons? (please specify)

.....

.....

.....

8. As part of your normal care do you recommend to each woman that she exercises her pelvic floor muscles?

Yes ☐ Sometimes ☐ No ☐

9. Do you provide any instruction on how to do pelvic floor contractions?

Yes ☐ Recommend/ ☐ No ☐ if no: go to Q. 10
remind only

If yes: When do you mainly provide the instruction?

Antenatal class ☐
Antenatal care ☐
During the stay in hospital ☐
Early postnatal - up to 10 days postpartum ☐
Late postnatal - 10 days postpartum or later ☐
On patient referral for incontinence ☐
Other (Please specify).....

What method/s do you employ in teaching pelvic floor contractions? (Please tick as many as applicable)

Leaflet / written instruction ☐
Verbal instruction ☐
Visual aids ☐
Physical instruction / biofeedback (Please specify details) ☐
.....
.....
.....

How long do you spend with each woman during her initial instruction in pelvic floor exercises/ (Please tick one answer only)

Less than 5 minutes ☐
Between 5 & 10 minutes ☐
Between 10 & 15 minutes ☐
Between 15 & 30 minutes ☐
30 minutes or more ☐

What is the usual programme of exercise that you recommend to each woman?

Time spent exercising per day
Number of sessions of exercise per day
Number of slow contractions per session of exercises
Length of held slow contractions (in seconds)
Number of fast contractions per session of exercises

Do you verify that each woman contracts only the pelvic floor muscles whilst doing pelvic floor exercises?

Yes ☐ Sometimes ☐ No ☐

If yes: What means do you use to ensure she is contracting the correct muscles? (Please tick as many as applicable)

Interruption of midstream urine flow ☐
Palpation of abdominal and /or gluteal muscles ☐
Palpation of vagina ☐
Palpation of perineum ☐
Observation of perineum ☐
Vaginal cones ☐
Withdrawal of tampon / foley catheter etc ☐
Perineometer ☐
Other (Please specify).....
.....

Are you satisfied with the programme of instruction on pelvic floor exercises that you are able to provide?

Yes ☐ No ☐

If no: Why are you dissatisfied?

Lack of time available to spend with each woman

☐

Lack of information / training given to yourself

☐

Lack of informative material to give to women

☐

Lack of equipment to use in treating condition

☐

Other (*please specify*).....

With regard to your position within the profession, could any improvements be made in the programme of instruction that you are able to provide?

Yes ☐ No ☐

If yes: What improvements would you like to see incorporated? (Please specify)

.....

.....

.....

.....

Are There any reason/s why you are currently unable to offer the improvements you have suggested?

Yes ☐ No ☐

If yes: What are they? (Please specify)

.....

.....

.....

.....

10. Are there any other comments that you would like to make about the care of stress incontinent women?

.....

.....

.....

Appendix 11

Multivariate Analysis

First descriptive statistics were used to summarise the data from each of the items on the questionnaire or medical records. For the most part this involved calculating frequencies and percentages, where relevant means, standard deviation and a range were also included.

Following this, measures of difference or association were used in order to consider differences or relationships between various factors. As the data was in the form of both nominal and interval data, two different measures were used.

For nominal data the Chi-squared test was selected. A two-tailed test was used with the 5% significance level reported. The unrelated t-test was used to consider the differences between two groups of participants in relation to interval data ie, birthweight, head circumference, age, length of labour and blood loss. Again, significance was reported at the 5% level.

Once it became evident which variables were associated with the development of stress incontinence, these were now considered in relation to each other. Again the Chi-square test and the unrelated t-test were used where appropriate. In addition, where both variables were collected in the form of interval data, Pearsons Moment Correlation Coefficient was used to examine the degree of correlation between them. Again, if the probability that the correlation occurred by chance was 5% or less the relationship was taken to be significant and the correlation (r) and direction of the relationship noted. A graph was also plotted in order to illustrate the degree of correlation.

Once it was ascertained which variables were associated with the development of stress incontinence, the next step was to consider the associations between two or more of the independent variables using multivariate analysis. The data thus consisted of a dependent variable, that of stress incontinence, and other independent variables which were a mixture of continuous, categorical and dichotomous data.

A range of multivariate statistical tests were considered with respect to two aspects: a) their function and b) the variables they used. Initially it was decided to use multiway frequency analysis (logit analysis) to assess the relationships between the different variables. However, many of the cell frequencies were too low for the analysis to be of value. Tabachnick and Fidell (1996) recommended that all expected frequencies were >1 and that no more than 20% were less than five. Data in the present study violated these criteria with respect to both conditions, therefore this method was abandoned.

Discriminant function analysis and logistic regression are both statistical tests with a similar aim, that of predicting group membership. Each uses one dependent variable and multiple independent variables in order to make the prediction. The techniques differ in three ways: a) whilst in discriminant function analysis the assumption is made that the dependent variable has a Gaussian distribution, this is not the case with logistic regression. b) the dependent variable in discriminant function is expressed as a probability of group membership. This is not the case in logistic regression. c) It is possible to consider more than one nominal dependent variable in discriminant function analysis but not so with logistic regression.

As data in the present study generally fitted the requirements and would allow prediction of stress incontinence from a combination of variables associated with the condition, both

appeared to be suitable for the study. It was decided therefore to incorporate both techniques, in order that the results could be checked against each other.

These were:

age
ethnicity
parity
method of delivery
blood loss
birthweight
head circumference
total length of labour.

Although not significant, age showed a trend to be positively associated with stress incontinence. Other research findings have reported such a significant association. For this reason it was included in the multivariate analysis. Two variables were excluded at this stage. These were ethnicity and total length of labour. Ethnicity was excluded as it was thought that the data may have been biased, with non caucasian women not reporting stress incontinence. In addition numbers in this category were few. Total length of labour was also excluded as no data had been collected on the women who had had a caesarean section. It was thought that this factor would heavily influence the results. However, a logistic regression analysis was also undertaken separately for women who had had a spontaneous or instrumental delivery.

Discriminant Function Analysis

In discriminant function analysis the independent (predictor) variables are used to classify cases into groups. The groups are defined by the dependent variable. In the present study this translates as predicting whether or not an individual has stress incontinence by virtue of their age, parity, method of delivery and so forth. Output shows the percentage of women that can be correctly predicted into either one of the groups. Additional information given includes indicating which variables are the most useful in predicting stress incontinence. It also shows a measure of association between the independent variables. The dependent variable must be dichotomous, or categorical if the aim is to discriminate between more than one group. The independent variables can be continuous, categorical or dichotomous. For the discriminant function to be 'optimal', some assumptions must be met. These are:

- a) the independent variables should show a normal distribution. However, the test is robust if violations to normality are caused by skewness rather than outliers. As discrimination is highly sensitive to the inclusion of outliers these should be eliminated or transformed.
- b) the probability of subgroup membership is a straight line or linear function.

Prior to beginning the analysis steps were taken to improve the quality of the data.

1) Correlations between each of the variables were undertaken to ensure that they were not too closely associated. Two variables, head circumference and birthweight were strongly correlated ($r = 0.7$). Head circumference was therefore excluded from the multivariate analysis as it was thought to be associated with stress incontinence by virtue of its close relationship to birthweight. In addition, other research studies have not found it to be related to stress incontinence.

2) The data was checked in terms of its distribution, ie that it was not too heavily skewed with less than 10% in any one category. The data appeared to satisfy this criteria, so no changes were made.

3) Outliers were removed from two variables, blood loss and weight.
No further manipulation of data was necessary.

Data was entered using the stepwise method as it was not known which variables were the most important for group separation. The default was used for entry and removal criteria. As the data was based on a random sample the proportions of women in each group was thought to be representative of a wider population. For this reason the prior probability, computed from group sizes, was used in the function. The results are shown below.

Logistic Regression

Logistic regression predicts the probability that an event will occur. In terms of the present study, variables such as age, parity, method of delivery are used to predict whether an individual will have stress incontinence. In terms of the data, logistic regression uses a dichotomous dependent variable, ie the presence or absence of symptoms of stress incontinence. Changes were made to two of the independent variables parity and method of delivery. These were both categorised into the two categories that appeared to best differentiate into stress incontinence or not using univariate analysis. These were:

a) parity into parity 1 or not

b) method of delivery into caesarean section or not.

No further manipulation or data check was necessary. Three models were entered using this method.

Model 1 - The data was entered in two steps. Parity and method were entered in block 1 using the entry method. The reason being that these two variables were found to be highly correlated with stress incontinence both according to the literature and also the discriminant function analysis. The following variables, age, blood loss and weight were added into the second block using the forward conditional method to see whether they added any further strength to the relationship.

Two further analysis were conducted. The sample was split into women who had had a spontaneous or instrumental delivery and those who had had a caesarean section.

Model 2 - The analysis was undertaken to see if any variables could be used to predict stress incontinence in women who had had a spontaneous or instrumental delivery. The following variables were included: parity, age, blood loss, birthweight and in addition, total length of labour. All variables were entered using the forward conditional method.

Model 3 - Model 3 was used to determine whether any variables could predict stress incontinence in women who had had a caesarean section. The variables parity, age, blood loss and birthweight were included in the analysis. All were entered using the forward conditional method.

General Exercise

The Sample

Prior to becoming pregnant, two thirds of the women rarely undertook exercise for periods of twenty minutes or more. Two hundred and eighty nine (40.5%) women exercised less than once per week, whilst one hundred and eighty eight (26.4%) exercised just once per week. One hundred and seventy two (24.1%) undertook exercise between two and three times per week, and twenty five women (3.5%) between four to six times per week. Thirty three (4.6%) women performed daily exercise prior to becoming pregnant. (Information was missing in 6 cases (.8%)).

The Association With Stress Incontinence

No relationship was found to occur between the frequency of exercise undertaken prior to pregnancy and the prevalence of stress incontinence during pregnancy (Chi 2 = 0.77579, p = 0.942. d.f. = 4).

Smoking Habits

The Sample

Four hundred (69.8%) women were non smokers. Forty one (7.1%) women smoked between one and nine cigarettes per day, fifty (9.0%) between ten and nineteen and twelve (2.0%) smoked twenty or more per day. Information was missing in sixty eight (11.8%) cases.

Cigarette Smoking

	No.	%	Stress incontinent	Not incontinent
Never	400	69.8	130	265
One to nine	41	7.1	16	25
Ten and nineteen	50	9.0	14	36
Twenty or more	12	2.0	2	9
Missing = 70			Missing = 75	

The Association With Stress Incontinence

There was no relationship found between the prevalence of stress incontinence following delivery and womens' smoking habits (Chi 2 = 2.30997, p = 0.511 d.f. = 3)

Induction Of Labour

The Sample

Three hundred and seventy six (65.6%) women had a labour which began spontaneously. One hundred and eleven (19.3%) women had their labour induced. Forty six (8%) women did not begin labour as they had a planned caesarean section. Information was missing in thirty seven (6.4%) cases.

The Onset Of Labour

	No.	%	Stress incont.	Not incont.
Spontaneous	376	65.6	120	250
Induced	111	19.3	37	71
No labour	46	8.0	7	41
Missing = 40			missing = 46	

The Association With Stress Incontinence

Whilst a relationship was found to occur between the induction of labour and the prevalence of stress incontinence following delivery (Chi 2 = 6.90944, p = 0.03160 d.f. = 2) this was not evident following removal of the women who had a caesarean section (Chi 2 = 0.126, p = 0.722 d.f. = 1).

Augmentation Of Labour

The Sample

Seventy one (12.3%) women had their labour augmented, four hundred and eight (71.2) did not. Information was missing in ninety four (16.4%) cases.

	No	%	StressNot incont.	incont.
Yes	71	12.3	25	46
No	408	71.2	124	277
Missing = 93			Missing = 101	

The Association With Stress Incontinence

No relationship was found to occur between augmentation of labour and the prevalence of stress incontinence following delivery (Chi 2 = 0.514, p = 0.4746, d.f. = 1)

Methods Of Induction And Augmentation

The Sample

Two hundred and nine (36.4%) women had their membranes ruptured artificially, three hundred and seventeen (55.3%) did not. Information was missing in forty seven (8.2%) cases. Ninety six (16.7%) women were given oxytocin to induce or augment their labour, four hundred and thirty (75%) were not. Information was missing in forty seven (8.2%) cases. Ninety seven (16.9%) women were administered prostaglandins, four hundred and twenty nine (74.8%) were not. Information was missing in forty seven (8.2%) cases.

Induction And Augmentation Of Labour

	Yes	%	No.	%	Missing	%
Augmentation	71	12.3	408	71.2	94	16.4
A.R.O.M.	209	36.4	317	55.3	47	8.2
Oxytocin	96	16.7	430	75.0	47	8.2
Prostaglandins	97	16.9	429	74.8	47	8.2

The Association With Stress Incontinence

No relationship was found to occur between each of the individual methods and stress incontinence following delivery. A.R.O.M. (Chi 2 = 0.394, p = 0.53 d.f. = 1), Oxytocin (Chi 2 = 1.49831 p = 0.221, d.f. = 1) Prostaglandins (Chi 2 = 1.117, p = 0.291, d.f. = 1).

Length Of Second Stage Of Labour

The Sample

The length of the second stage ranged from 1 minute to 268 minutes. The mean was 43 minutes and the standard deviation 48 minutes. (n = 459).

The Association With Stress Incontinence

The difference between the length of second stage of labour and stress incontinence following delivery was not found to be significant (p = 0.95, d.f. = 448, t-test = -1.67). Of the 156 stress incontinent women the mean length of labour was 38.07. The mean length of labour for the 294 asymptomatic women was 46.05. Information was missing in 22 cases.

Perineal Damage

The Sample

Two hundred and twenty four (39%) women had an intact perineum following delivery. Sixty seven (11.6%) had a first degree tear, one hundred and thirty (22.6%) had a second degree tear, and eight (1.3%), a third degree tear. One hundred and twelve (19.5%) women had an episiotomy. Information was missing in thirty two (5.5%) cases.

Perineal Damage

	No.	%	Stress incontinent	Not incontinent
Intact	224	39.0	60	162
First degree	67	11.6	25	40
Second degree	30	22.6	49	78
Third degree	8	1.3	2	6
Episiotomy	112	19.5	34	75
Missing information	31		Missing = 41	

The Association With Stress Incontinence

No association was found between the degree of perineal damage and the prevalence of stress incontinence (Chi 2 = 6.52, p = 0.164 d.f. = 4).

Number Of Babies Delivered

The Sample

Five hundred and fifty (95.9%) women delivered one baby whilst five (0.8%) women had two. Information was missing in eighteen (3.1%) cases.

	No.	%	Stress incontinent	Not incontinent
One	550	95.9	171	369
Two	5	0.8	0	5
Missing information = 17			Missing information = 27	

The Association With Stress Incontinence

No association was found between the number of babies delivered and the prevalence of stress incontinence (Chi 2 = 2.307, p = 0.129, d.f. = 1). However, as there was such a small sample of women who had had two babies, it is possible any lack of association resulted from this.

Feeding On Discharge

The Sample

At discharge, two hundred and seventy two (47.1%) women were breastfeeding, two hundred and thirty three (40.6%) women were using artificial milk and eight (1.3%) were supplementing breast milk with artificial means. Information was missing in fifty seven (9.9%) cases.

Feeding On Discharge

	No.	%	Stress incontinent	Not incontinent
Breastfeeding	270	47.1	80	190
Artificial means	233	40.6	75	155
Supplemented	8	1.3	2	6
Missing information	= 61		Missing information = 63	

The Association With Stress Incontinence

No association was evident between the type of feeding at discharge and the prevalence of stress incontinence following delivery ($\chi^2 = 0.649$ $p = 0.723$, d.f. = 2)

Additional Comments Made By The Health Professionals In The Survey

- I think this is a rather neglected area of antenatal and postnatal care, that is now being recognised as extremely important. (GP)
- Hidden problem, not reported. (GP)
- We do need more education and information to stress to the midwifery profession the importance of prevention as well as treatment. (Hospital midwife)
- I am completely unaware of how common this is antenatally and immediately postnatally. It must be a bigger problem than I realise. (GP)
- I feel it is a neglected area and that we can do more to help these women. (Health visitor)
- A lack of public knowledge for such a common problem. (Practice nurse)

- Many mums I visit do not admit to experiencing it postnatally until many months after delivery. (Health visitor)
- Women are reluctant to be referred if symptoms are minor, often preferring to do exercises and await events. (Community midwife)
- Women seem to live with it for extraordinary long periods, doesn't seem to be a priority. (Health visitor)
- Women seem to accept this problem, just as putting on weight is inevitable - but it isn't and shouldn't be. (Hospital midwife)
- Many women say very little about the problem - unless severe. (Community midwife)
- It is sometimes difficult for a woman to say she has a problem with incontinence. (Practice nurse)
- I think many women will not admit to having a problem with stress incontinence. (Health visitor)
- Many women have stress incontinence for many years and if it isn't acknowledged early on it tends to get hidden and therefore overlooked by the medical / nursing profession. (Health visitor)
- Mothers themselves are often dismissive of the importance of pelvic floor exercises (Hospital midwife)
- Some women are very keen to co-operate and to try exercise and advice, others not. The early puerperium is a difficult time to encourage the patient to do exercises. For a later stage to come to a class is difficult with babies. (Physiotherapist)
- We don't seem to come across much stress incontinence in this unit. - obstetrics (Hospital midwife)
- It isn't a particular problem in my perception and I've not gone out searching for literature to give out. (GP)

- I feel it is not a condition that is given the attention it deserves. more information needs to be available for clients to make them aware of the causes and treatment. (Health visitor)
- Raise profile on media. (Health visitor)
- I think the importance of pelvic floor exercises could be given a higher profile after delivery. (Health visitor)
- Need to raise the issue and awareness more. I think it often remains a silent problem. (Health visitor)
- More information should be available. Women should be able to self refer to appropriate trained person. More education is needed for nurses. (Practice nurse)
- I feel general awareness and openness regarding this condition amongst the public would increase take up of help (hospital midwife)

- Due to the quick turnover sometimes pelvic floor gets missed. (Hospital midwife)
- Talking about pelvic floor exercises tend to take a back seat as more urgent things are dealt with. (Hospital midwife)
- It is a very common problem but I do not have enough time to instruct correctly each patient properly. (GP)
- Other demands and priorities concerned with my caseload. (Health visitor)
- Women often feel not part of health visitors role to become involved in stress incontinence - often do not approach us with problems because of this. (Health visitor)
- Clients do not always see health visitors as nurses, therefore may be uncomfortable in receiving physical care from us, eg vaginal palpation. (Health visitor)
- An unpleasant isolating condition which often seems to be the subject of stigmatisation and embarrassment. Certainly this is an area within which nursing staff could develop their skills and expand their role. (Health visitor)
- I feel physiotherapists have this high on their agenda of care and that other clinicians should be made more aware of the importance of the pelvic floor. (Clinical specialist)*
- May be something picked up by health visitor at a later date. (Community midwife)
- As midwives we only see early problems - usually out of our jurisdiction. (Community midwife)
- I think midwives are ideally placed to start discussion about prevention of stress incontinence, especially with primigravida women who may have never heard of pelvic floor muscles. (Hospital midwife)
- I think specialist teams eg nurse practitioners are most appropriate, GP's can't do everything. Midwives often do not follow through with this care as they seem too busy. (GP)
- Should practice nurses be educated to train women? (GP)
- Women should see a professional who can assess level of stress incontinence and also the cause and offer appropriate treatment and follow up and a midwife only sees women for a limited period postnatally. (Community midwife)
- Stress incontinence takes some time to treat and given that a midwife is involved with women for a limited period only midwives are not the best people to carry out treatment. Women should be referred to other professionals where treatment can be followed through until there is a result. (Community midwife)
- Should be prioritised as part of health visiting work with clients routinely screened. (Health visitor)
- Specialist physio to deal with this may be more appropriate. (Health visitor)
- As midwives we should be providing more information to the women. (Hospital midwife)
- Much of the work is carried out by the obstetric physiotherapists (their defined role) but midwives have more contact with the women therefore training and resources should be available to them (Hospital midwife)
- Insulting to refer to district nurses who do continence assessment first. (Practice nurse)
- Not enough support available in the community. (Practice nurse)
- Addressed very poorly by health professional staff seeing clients in the postnatal period.
- A greater awareness is necessary from midwives and obstetricians of the implications of labour on the pelvic floor. (Hospital midwife)

- I feel the women get good care and advice from the ward physio although I feel that she doesn't get enough time to spend on the wards. I feel physio's are the experts and women are losing out by not benefiting from their experience. (Hospital midwife)
- My knowledge is limited and doubtless the information I am giving to the women falls short. (Hospital midwife)
- Little expert help. (GP)
- I don't think we listen enough to these women - hence they don't receive the correct information to help them. (Community midwife)
- This has made me realise I could be giving more information at the time of routine postnatal. (Practice nurse)
- Poor communication and sharing of information by hospital midwives. (GP)
- Physio's don't routinely visit the postnatal wards at weekends, we have to call them in and therefore some women are missed. (Hospital midwife)
- I would like more knowledge so I can help the women I meet better. There should be better liaison with midwives both antenatally and postnatally. (Health visitor)
- A neglected area. However a new community physio service could be very helpful if it is not inundated. It has just recently been set up and so far has been very useful. (GP)
- We have a super incontinence clinic locally - if no success with self help then referral for assessment. (Practice nurse)

The prevalence of stress incontinence during pregnancy and following delivery

Linda Mason, Sheila Glenn, Irene Walton and Carol Appleton

Objectives: to examine the variation in findings from epidemiological studies which describe the prevalence of stress incontinence during and after pregnancy, and to undertake a prospective survey of the prevalence of stress incontinence during pregnancy and following childbirth in order to provide clarification of the findings presented in the literature.

Design: a review of the literature was undertaken using the Medline and Popline CD Rom. A postal questionnaire was sent to a sample of women when they reached 34 weeks' gestation and repeated at 8 weeks postpartum.

Participants: 1008 women were recruited to the study when they attended the antenatal clinic at two hospitals in the north west of England. Seven hundred and seventeen (71%) women responded to the first questionnaire and 572 (57%) completed the second questionnaire.

Findings: the prevalence of stress incontinence during pregnancy reported in the literature ranges from 20 to 67%. Following delivery the reported prevalence is between 6 and 29%. In the present study 59% of women reported stress incontinence during pregnancy, and 31% following delivery. Ten per cent of the women had daily episodes of incontinence during their pregnancy, 2% of all women reported daily incontinence following delivery. An association was found between parity and stress incontinence, with women of higher parity being more likely to experience the condition. No difference in the prevalence of stress incontinence was found between women who had a normal delivery and those having an instrumental delivery. A caesarean section was found to be associated with a lower incidence of stress incontinence compared with a normal spontaneous delivery.

Key conclusion: a high proportion of women experienced stress incontinence during pregnancy and/or following delivery. Some women reported severe symptoms, with leakage on a daily basis. Women of higher parity were more likely to suffer from the condition. Whilst women who had a normal spontaneous delivery or an instrumental delivery reported a similar level of stress incontinence, women who had a caesarean section were less likely to have the condition.

INTRODUCTION

Incontinence can be defined as any uncontrolled leakage of urine, regardless of amount or frequency. A survey undertaken by MORI in 1991 estimated that at least three and one-half million, and possibly up to ten million people in the UK experience some form of urinary incontinence. However, its occurrence is greater in women than men, and also increases with age.

Stress incontinence

The most common form of urinary incontinence is that of stress incontinence (Cardozo & Stanton 1991). The International Continence Society (ICS) has defined stress incontinence as 'the involuntary loss of urine occurring when, in the absence of a detrusor contraction, the intravesical pressure exceeds the maximal urethral pressure' (Abrams et al. 1988). Stress incontinence

Linda Mason
BSc, MSc,
Postgraduate Researcher,
Liverpool John Moores
University, School of
Health, 79 Tithebarn
Street, Liverpool L2 2ER
UK

Sheila Glenn
BSc, PhD, C Psychol,
AFBPS,
Head of Research,
Liverpool John Moores
University, School of
Health, 79 Tithebarn
Street, Liverpool L2 2ER
UK

Irene Walton
BEd, MSc, RM, MTD,
Principal Lecturer in
Midwifery, Liverpool John
Moores University, School
of Health, 79 Tithebarn
Street, Liverpool L2 2ER
UK

Carol Appleton
MEd, RN, RM, MTD,
Senior Lecturer in
Midwifery, Liverpool John
Moores University, School
of Health, 79 Tithebarn
Street, Liverpool L2 2ER
UK

(Correspondence to LM)
Manuscript accepted
12 June 1998

These appeared to signal to the woman that the midwife was 'on her side', thereby encouraging the development of a trusting relationship between woman and midwife.

CONCLUSION

Although a small study of limited generalisability it is hoped that some insight has been gained into the processes operating when women make choices in pregnancy. In order to make choices that would help them to maintain equilibrium, women needed information that they trusted and which was sufficiently specific to themselves as individuals. The part played by midwives in providing and helping women use this information was crucial; women appreciated midwives who appeared trustworthy, supportive and genuinely concerned to help them make real choices.

REFERENCES

- Avis M 1992 Quality as participation. *Senior Nurse* 17: 12-18
- Biley FC 1992 Some determinant that affect patient participation in decision making about nursing care. *Journal of Advanced Nursing* 17: 414-421
- Brain M 1990 The midwife's contribution. In: Chamberlain G, Zander L (eds) *Pregnancy care in the 80s*. Parthenon Publishing Group, Carnforth
- Brearley S 1990 Patient participation: the literature. Royal College of Nursing, Research Series, Scutari Press, Middlesex
- Brown S, Lumley J, Small R et al 1994 *The missing voices of motherhood*. Oxford University Press, Melbourne
- Clement S, Sikorski J, Wilson J, Das S 1997 Planning antenatal services to meet women's psychological needs. *British Journal of Midwifery* 55: 298-305
- Davison BJ, Degner LF, Morgan TR 1995 Information and decision-making preferences of men with prostate cancer. *Oncology Nursing Forum* 22(9): 1401-1408
- Department of Health 1993 *Changing childbirth*, report of the expert maternity group. HMSO, London
- Donovan JL, Blake DR 1992 Patient non compliance: deviance or reasoned decision making? *Social Sciences and Medicines* 34(5): 507-513
- Eddy D 1988 Variation in physician practice: the role of uncertainty. In: Dowie J, Elstein A (ed) *Professional judgement: a reader in clinical decision making*. Open University Press, Milton Keynes
- Farrant W 1980 Who's for amniocentesis? The politics of prenatal screening. In: Homans S (ed) *The sexual politics of reproduction*. Gower, London
- Glaser BG, Strauss AL 1967 *The discovery of grounded theory*. Aldine de Gruyter, New York
- Green J, Coupland VA, Kitzinger JV 1988 *Great expectations: a prospective study of women's expectations and experiences of childbirth*. Centre for Family Research, Cambridge
- Jackson K 1993 A woman's choice: a wife's dilemma? *British Journal of Midwifery* 1(5): 6-27
- Kirkham M 1993 Communication in midwifery. In: Alexander J, Levy V, Roch S (ed) *Midwifery practice: a research based approach* vol 4. Macmillan, Basingstoke
- McKay S, Smith SY 1993 What are they thinking about? Is something wrong? Information handling during the second stage of labor. *Birth* 20(3): 147-147
- MIDIRS 1997 New on the net. MIDIRS Midwifery Digest March (1): 15
- Moline JN 1986 Professionals and professions: a philosophical examination of an ideal. *Social Science and Medicine* 22: 501-508
- Ralston R 1994 How much choice do women really have in relation to their care? *British Journal of Midwifery* 29: 453-456
- Richards J 1997 Too choosy about choice: the responsibility of the midwife. *British Journal of Midwifery* 53: 163-167
- Strauss AL, Corbin J 1990 *Basics of qualitative research: grounded theory procedures and techniques*. Sage Publications, California
- Waterworth S, Luker KA 1990 Reluctant collaborators: do patients want to be involved in decisions concerning care? *Journal of Advanced Nursing* 15: 971-976

occurs when the urethra is unable to maintain closure against the force of pressure transmitted from the bladder. Whilst the causes are not yet fully understood, it is thought that an incompetent urethral sphincter mechanism may be responsible (Ulmsten 1997).

Stress incontinence occurring during pregnancy may be due to a different mechanism compared to that following delivery. Hormonal changes occurring within the body during pregnancy may affect the ability of the urethral sphincter mechanism to withstand stress. It is thought that the hormone relaxin may be responsible for softening the connective tissue and ligaments during pregnancy in order to allow the baby's head to be pushed out during childbirth. However, progesterone and oestrogen may also be partly responsible for this (Dolman 1992).

During the course of delivery the fetus descends through the vagina to the outside. The soft tissue of the pelvis becomes displaced as the fetal head descends. The bladder is pushed upwards into the abdomen resulting in stretching and thinning of the urethra (Malpas et al. 1949). Although the pelvic organs and tissues accommodate the fetus by displacement or by stretching and thinning, a great amount of force is exerted on the pelvic floor during this process (Ganey 1955). Nerve damage to the muscles, ligaments or fascia may occur at this time (Snooks et al. 1984, Allen et al. 1990), affecting the ability of the urethral sphincter mechanism to withstand additional force.

The symptoms

The symptom of stress incontinence is leakage of urine simultaneous to the stress causing it, such as on exertion or during physical exercise. Commonly associated activities are coughing, laughing, lifting heavy weights, or during sexual intercourse or physical exercise. Stress incontinence is not always evident on clinical examination, and diagnosis is usually made by exclusion of other conditions. Studies have shown that symptoms of stress incontinence do not always correlate with a diagnosis of the condition (Lagro-Janssen et al. 1991, De Muylder et al. 1992). Urodynamic investigations have not been undertaken in the majority of studies reviewed here, thus the findings relate only to the prevalence of symptoms. Some of the women with symptoms of stress incontinence may have a diagnosis of detrusor instability or mixed incontinence.

The literature

Epidemiological surveys of the prevalence of stress incontinence show that it affects many

women during pregnancy and following childbirth. However, studies vary in their findings, with reported prevalence during pregnancy ranging from 23% (Iosif 1981) to 67% (Francis 1960). Fewer women are reported to suffer from stress incontinence following childbirth, although again there are wide discrepancies between the study findings. The reported prevalence following delivery ranges from 6% (Dimpfl et al. 1992) to 29% (Francis 1960). Previous studies of stress incontinence during pregnancy and following delivery are summarised in Table 1.

Differences in the methods used between studies may account for some of the variation in findings. For example, results of incontinence surveys have been found to be affected by the way questions are asked, Milne (1976) reported a prevalence of 12% in one population and 31% in a similar population when the question order was rearranged. Ways in which the methods differ between studies are (a) the response rate, (b) the measure used to assess whether symptoms are present, (c) the timing of the study and (d) the sample. Because of these differences it may be difficult to make valid comparisons between the studies.

Response rate

In most studies the authors have not published any information on their response rate. The following studies have provided this information: Becket (1987) 55%, MacArthur et al. (1993) 78% and 82% for the follow-up study, Wilson et al. (1996) 70.4% and Iosif (1981) 94%. Of these, only Wilson et al. considered the effect of non-response on the data. They found non-responders were significantly younger, required less analgesia and had labours which were more likely to start spontaneously. The non-responders also had babies with higher average birth-weights. However, as these factors were found not to be independently related to incontinence, the authors concluded that the prevalence would not markedly change if they had been included.

The measure

Questionnaires and/or interviews have been used to collect data and some of the variations in the findings may be accounted for by differences in the questions and responses used. Variations may occur because of:

1. the question used to determine whether symptoms are present
2. the criteria used to measure the severity of the condition
3. the classification of the responses.

Studies have determined the prevalence of stress incontinence during pregnancy or following childbirth by subjective means, i.e.

Table 1 Differences in methods and results in previous studies

Author	Response rate	Measure	Timing of survey	Point/interval measured	Prevalence	Sample
Becket 1987	55.7%	'whether they had suffered any incontinence in the last 3 months'	3 to 6 months postpartum	In the last 3 months	42.6%	All women had a baby in last 3 to 6 months
*all types of incontinence						
Beck & Hsu 1965	not stated	'presence or absence of stress incontinence'	Retrospective not related to any pregnancy	During any pregnancy/ following any delivery	*	All women attending continence clinic
* cannot be calculated from the information given						
Dimpfl et al. 1992	not stated	'defined according to the ICS'	Whilst in antenatal ward	During last 3 months of pregnancy	54%	Attendees at clinic those with prior symptoms excluded
			6 to 12 weeks postpartum	At 6 weeks and at 12 weeks postpartum	6% 6%	
Francis 1960	not stated	'questioned with regard to stress incontinence'	prospective	during pregnancy	67%	Unselected women attending antenatal clinic
			up to 6 months postpartum	up to 6 months postpartum	29%	
Iosif 1981	94%	'does any urine escape during exertion, e.g. coughing, lifting heavy objects, climbing stairs etc.'	7 to 14 days postpartum	during pregnancy	24%	All maternity 'patients'
McArthur et al. 1993	78% of those receiving questionnaire	'hard to hold urine when you jump, sneeze etc.'	retrospective 13-18 years after the birth	symptoms occurring up to 1 year postpartum	20% (at least)	All women delivering most recent child between 1987 and 1985
Stanton et al. 1980	not stated	'questioned about their urological symptoms'	at intervals 32, 34, 36 and 40 weeks of pregnancy postnatal visit	during pregnancy	39%—nulliparous 42%—multiparous	Women attending antenatal clinic
				during postnatal period	5.8%—multiparous 10.6%—multiparous	
Viktrup et al. 1992	not stated	'whether they had incontinence provoked by physical stress'	3 to 5 days postpartum	during pregnancy	32%	Primiparous women attending clinic
Wilson et al. 1996	70.5%	'enquiry was made about the prevalence type and frequency of urinary incontinence'	3 months postpartum	following delivery up to 3 months	6%	All women 3 months postpartum resident in the area
			3 months postpartum	at 3 months postpartum	24%	

questioning the women about any symptoms they may have, or have had in the past, or within a specified period of time. A standard measure has not been used across the studies. Stanton et al. (1980) used 'loss of urine on physical effort', MacArthur et al. (1993) 'hard to hold urine when you jump, sneeze etc'. and Iosif (1981) 'coughing, lifting heavy objects, climbing stairs etc'. Many studies (Francis 1960, Becket 1987) have not provided details of the criteria used to obtain the findings. Others have provided a description of

the question but do not cite it, for example, 'women were questioned about the presence or absence of stress incontinence' (Beck & Hsu 1965). Many studies limit the question to specific activities such as coughing, laughing or sneezing, yet many different forms of physical activity may trigger urinary leakage. Bo (1994) found that participation in sport or fitness activities was the main problem. If the question is limited to very specific activities a number of women with stress incontinence may give a negative answer.

Some studies have also incorporated some measure of the severity of incontinence. Again a standard measure has not been used across studies. Criteria have included: the frequency of episodes of incontinence (MacArthur et al. 1993), the use of sanitary protection (Wilson et al. 1996) and the need to change underwear (Iosif 1981). Some studies have incorporated more than one of these measures.

Where studies have used similar criteria to assess the severity of the condition, the wording of the question or the list of responses may be different. Taking the frequency of episodes of incontinence as an example, Sleep and Grant (1987) used 'less than once per week, once or twice per week, or three times or more per week', whilst MacArthur et al. (1993) included 'occasionally, during some part of every month, on one or two days each week, at least once a day, and all the time'.

Timing of the survey

Surveys undertaken either during pregnancy or following delivery have been carried out at different stages of pregnancy or postpartum. The incidence of stress incontinence has been found to increase to a peak during the last few weeks of pregnancy (Stanton et al. 1980). Surveys carried out in later pregnancy are, therefore, likely to have reported a higher incidence of stress incontinence than those carried out at an earlier stage. A number of studies report the prevalence retrospectively and thereby include any symptoms occurring during pregnancy. Retrospective reports, however, are likely to be less accurate than contemporary accounts.

The puerperium is considered to last six weeks, during which time the woman's body returns to its pre-pregnant state. Whilst involution is occurring, the muscles of the pelvic floor also start to regain their strength, as do the softened ligaments (Sultan et al. 1994). Studies carried out prior to six weeks postpartum will, therefore, measure stress incontinence in women whose pelvic floor muscles and ligaments are still in the process of returning to their pre-pregnant state. Studies carried out at a later stage in the postpartum will include a greater proportion of women for whom involution and the associated physiological changes have been completed.

The sample

The parity of the sample varies between the studies. Evidence from previous studies has shown that parity is associated with the development of stress incontinence. Nulliparous women report a lower incidence of stress incontinence than multiparous women (Stanton et al. 1980, MacArthur et al. 1993). Women of lower order parity are less likely to report stress

incontinence than women of high parity (Wilson et al. 1996). Viktrup et al. (1992) included a sample of nulliparous women only, Francis (1960) reported the findings separately for nulliparous and multiparous women, whilst Wilson et al. (1996) incorporated findings from both nulliparous and multiparous women.

Vaginal delivery is believed to be a risk factor for stress incontinence. Studies have shown that vaginal delivery may cause pudendal nerve damage and subsequent denervation of the pelvic floor, whereas a caesarean section may have a protective effect, especially if carried out as an elective surgical procedure (Snooks et al. 1984, Allen et al. 1990). It follows, therefore, that a higher incidence rate might be expected in studies such as that by Dimpfl (1992) or Sleep and Grant (1987) whose samples included only women who have had a vaginal delivery.

An examination of the findings from epidemiological studies on stress incontinence has revealed wide variations in the reported prevalence of stress incontinence both during pregnancy and following delivery. Some of the variation may be explained by differences in the methods used across the studies. The present study has, therefore, been undertaken to provide further clarification of the prevalence of stress incontinence at such times.

METHODS

The present study was designed to be representative of the general population of women using antenatal and postnatal services. Women were, therefore, included in the study irrespective of their obstetric history and the sample comprised both nulliparous and multiparous women, regardless of the type of delivery they went on to have. The study was undertaken prospectively with the aim of collecting contemporary data on a sample of women initially at 34–36 weeks of pregnancy and again at 8–10 weeks postpartum. The questionnaire was designed with the aim of identifying all women with symptoms of stress incontinence at these times. A measure of severity of the condition was also included.

Ethical approval for the study was granted by the Local Research Ethics Committees of both hospitals involved in the research.

Participants

It was intended to recruit 1000 women. As previous studies on stress incontinence following delivery have reported a prevalence of between 6% (Dimpfl et al. 1992) and 29% (Francis 1960), it was anticipated the sample would include a minimum of 60 women with postpartum stress incontinence. This sub-sample of women was

deemed large enough to allow statistical comparisons to be made between stress incontinent and continent women with regard to a number of possible risk factors.

The sample of women was recruited to the study during a five month period when they attended the antenatal clinic for their first antenatal visit in two hospitals in the north west of England. This was usually at 'booking' or, if they had already been 'booked' in the community, when they attended for an ultrasound scan. The hospitals confirmed that the number of pregnant women missed at these stages would be negligible. Each woman attending clinic during the period of recruitment was presented with an information sheet outlining the research, and invited to take part. One thousand and eight women provided written consent to participate. However, the questionnaire was not sent to any woman if there was an element of doubt over whether she was still pregnant. Checks to determine this were made either via the hospital computer system, or the records and only 918 copies of questionnaire 1 were sent out. Of these, 717 were returned completed, a response rate of 78%.

Questionnaire 1 was sent out at 34 weeks of pregnancy. A reminder was sent out two weeks later if the questionnaire had not been returned. Thirty four weeks was chosen as the optimal time to send out the questionnaire. Symptoms have usually developed by this stage of gestation and it would also ensure that the majority of women delivering prior to term would still be included in the sample.

Questionnaire 2 was posted to all women who agreed to take part in the research, irrespective of whether they had returned questionnaire 1. However, the questionnaire was not sent to any woman who had had a miscarriage, a stillbirth, or if a neonatal death had been recorded. In addition, a questionnaire was not sent if the birth outcome was not known to the research team. Eight weeks postpartum was chosen to ensure a large proportion of the sample would have recovered physiologically from the birth whilst also allowing for recall of events around the time of delivery. Eight hundred and ninety-four copies of questionnaire 2 were sent out. Five hundred and seventy-two were returned completed giving a response rate of 64%.

Instrumentation

Because no standardised measure has been used across studies to obtain data on the prevalence of stress incontinence and the severity of the condition, a questionnaire was devised specifically for the study.

The prevalence of stress incontinence

The prevalence of stress incontinence was determined by a positive response to the following question:

'Do you leak urine during physical activity or exertion, for example, whilst coughing, laughing, lifting heavy objects, climbing stairs, during sex etc?'

'Yes'

'No'

'No, but have in the past'

The severity of the condition

The severity of the condition was measured by means of questions on the frequency of leakage, use of sanitary protection and the need to change underwear because of accidental leakage. A question on the volume of leakage was not included as studies have shown that the subjective quantification of urine loss does not correlate with objective measures (Frazer et al. 1989, Kondo et al. 1991). The questions and responses were as follows:

'How often do you leak urine?'

'Occasionally'

'Once a week'

'Several times per week'

'Daily'

'Do you ever need to wear a sanitary towel for this reason?'

'Never'

'Occasionally'

'Always during exercise'

'Most every day'

'Do you ever need to change your underwear for this reason?'

'Never'

'Occasionally'

'Always during exercise'

'Most/every day(s)'

Additional information

Additional information on a range of maternal and obstetric factors, such as parity and type of delivery, was taken from the medical record of each respondent. In some instances the medical record was unobtainable, in other cases information was missing on specific variables.

Data analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS for Windows, Release 7.0.1). The χ^2 test was used the significance of group differences for categorical data.

FINDINGS

Characteristics of sample

The participants ranged in age from 16 to 45 years. At the time questionnaire 1 was sent out 34 women (4.8%) were under 20 years of age, 357 women (49.8%) were between 20 and 29 years of age, 304 women (42.3%) were between 30 and 39 years of age, and 22 women (3%) were 40 years or over. Three hundred and sixteen women (44%) were nulliparous and 401 women (56%) were para 1 or greater. The sample included seven women who had had five or more children.

Stress incontinence in pregnancy

Of the 717 women returning the questionnaire, 419 (59%) reported having symptoms of stress incontinence during their pregnancy. For a number of these women the episodes of leakage were frequent. Two hundred and seven of these women (50% of incontinent women) had leakage daily or on several occasions each week during their pregnancy. Forty-six women (11% of the incontinent women) had to wear a sanitary towel for protection against leakage either on most days or every day. Thirty-eight women (9%) had to change their underwear most or every day. The frequency and severity of stress incontinence

symptoms during pregnancy are shown in Tables 2 and 3.

In the majority of cases the condition first began during this pregnancy. This was the first incidence of stress incontinence for 264 women (63% of all incontinent women). One hundred and twenty-seven women (30%) had prior symptoms which began in connection with a previous pregnancy or delivery. Twenty-five women (6%) had symptoms before ever becoming pregnant (information was missing for three women).

Stress incontinence following delivery

At eight weeks postpartum 179 women (31%) reported symptoms of stress incontinence. Nearly one-quarter of the women who reported symptoms at this time, 43 in total, had daily episodes of incontinence or episodes occurring several times per week. Thirteen women (7% of those who reported incontinence post partum) had to wear a sanitary towel for protection from incontinence on most days or every day. Twelve women needed to change their underwear because of leakage most or every day (these were not mutually exclusive, neither were they all the same women). The frequency and severity of symptoms are shown in Tables 4 and 5.

Of the women who reported stress incontinence following delivery, one-quarter of the sample, 45 women, had had no symptoms prior to this. Symptoms began during the pregnancy for another 45 women. Seventy-six women (43%) had symptoms which first started in connection with a previous pregnancy or delivery. Twelve women (7%) had symptoms before ever becoming pregnant (information was missing for one woman).

Parity was found to be significantly related to the prevalence of stress incontinence following delivery ($\chi^2 = 20.33$, d.f. = 8, $p = 0.009$) (Table 6). The relationship was positive, women of higher parity were more likely to have stress incontinence following delivery. A significant relationship was also found when comparing women of para 1 with the rest of the sample. Women of para 1 had a lower prevalence of stress incontinence ($\chi^2 = 9.60$, d.f. = 1, $p = 0.001$). A comparison of women with para 1, 2, 3, 4 and 5+ also

Table 2 The frequency of incontinence episodes during pregnancy

Episodes	No. women	% incontinent	% total
< once per week	148	34	20
once per week	67	16	9
several times per week	141	33	19
daily	72	17	11

The percentages are given to the nearest whole number

Table 3 The frequency with which women wore a sanitary towel/changed their underwear owing to leakage during pregnancy

Frequency	Sanitary towel			Change underwear		
	No.	% incontinent	% total	No.	% incontinent	% total
never	252	58	35	126	28	17
occasionally	119	28	17	255	61	36
always during exercise	9	2	1	10	2	1
most/every day (s)	47	11	6	38	9	5

showed a significant correlation. The higher the parity the greater the prevalence of stress incontinence ($\chi^2 = 10.53$, d.f. = 3, $p = 0.01$). However, no significant difference was found in the prevalence of stress incontinence in women of para 4 and under, compared to women with five or more children. As the latter category included only 13 women, it is likely this figure is too small to be able to make any relevant comparisons.

There was no significant difference in the prevalence of stress incontinence in women who had a normal vaginal delivery compared to those who had an instrumental delivery (Table 7). There was, however, a significant reduction in the prevalence of stress incontinence in women who had a caesarean section ($\chi^2 = 10.85$, d.f. = 1, $p = 0.0009$). Further analysis of the data on women who had caesarean section found no difference in the prevalence of stress incontinence following an emergency caesarean section compared with an elective caesarean section.

Table 4 The frequency of incontinence episodes following delivery

Frequency	No women	% incontinent	% total
occasionally	128	71	23
once per week	8	4	1
several times per week	29	16	5
daily	14	8	2

Table 5 The frequency with which women wore a sanitary towel/changed their underwear owing to leakage following delivery

Frequency	Sanitary towel			Change underwear		
	No.	% incontinent	% total	No.	% incontinent	% total
never	107	59	19	49	28	9
occasionally	52	29	9	111	63	20
always during exercise	7	4	1	3	2	1
most/every day (s)	13	7	2	12	7	2

Table 6 The parity of the sample in relation to their continence status

Parity	No. incontinent	% incontinent	% total	No. continent	% continent	% total
1	55	35	10	169	50	30
2	58	36	10	104	30	18
3	32	20	6	46	13	8
4	8	5	1	16	5	3
5+	7	4	1	6	2	1
7	7			7		
no information	19			51		

Table 7 The mode of delivery and its relationship to stress incontinence

Mode of delivery	No. incontinent	% incontinent	% total	No. continent	% continent	% total
normal	125	79	22	233	69	41
planned caesarean	7	4	1	37	11	6
emergency caesarean	7	4	1	34	10	6
forceps	9	6	2	19	6	3
ventouse	11	7	2	16	4	3
no information	20			53		

DISCUSSION

In this study an attempt has been made to provide further clarification on the prevalence of stress incontinence during pregnancy and following delivery. The study also aimed to overcome some of the methodological weaknesses which were present in a number of previous studies. The study was carried out prospectively in order to provide a more accurate response than would occur using a retrospective study. The sample was designed to be representative of women using antenatal and postnatal services, irrespective of their obstetric or urological history. A broad definition of the symptoms was used so that all women with symptoms of stress incontinence were included in the prevalence rate. The severity was assessed by means of three different subjective measures. All details of the procedure including the measures and response categories have been provided so that comparisons with other studies may be made.

A limitation of the study was the possible bias effect of non-response upon the prevalence rate. The first questionnaire produced a response rate of 78%, whilst the second questionnaire had a return of 64%. A bias may have occurred in either direction, leading to a lower or, a higher prevalence rate being reported compared with the 'true' rate. However, this factor was taken into account and a range calculated, within which the 'true' prevalence will lie (see later). A

second problem regarded the timing of the survey. There does not appear to be an optimal time for measuring the prevalence of stress incontinence following delivery. Previous studies were carried out at varying times up to three months postpartum. The present study measured stress incontinence at eight weeks postpartum so that events occurring around the time of delivery could be recalled easily and with accuracy. However, it is possible that not all women in the sample had fully recovered physiologically from the birth by this time.

In this study it has been shown that the symptoms of stress incontinence are common, affecting over one-half of all women during pregnancy. Previous work by Dimpfl et al. (1992) and Francis (1960) has been confirmed. However, other studies have reported a much lower prevalence of stress incontinence. Iosif (1981) reported a rate of 23%, Viktrup et al. (1992) 32% and Stanton et al. (1980) 39% for nulliparous women and 42% for multiparous women. It has previously been stated that differences in the methods may have a considerable effect upon reported prevalence rates. Much of the differences between the studies may be explained by the variation in methods (see Table 1 for details).

Seven hundred and seventeen women responded to questionnaire 1, giving a response rate of 78%. The prevalence was, therefore, recalculated first by making an assumption that all non-responders were continent. This would give a prevalence of 46%. Alternatively, if all non-responders were assumed to be stress incontinent, the prevalence would be 68%. A conclusion may be drawn from this that the true prevalence of stress incontinence found in the present study lies somewhere in the range of 46–68%.

Following delivery, stress incontinence was reported by nearly one-third of the sample. This finding is similar to that reported in the studies by Francis (1960), MacArthur et al. (1993) and Wilson et al. (1996). The prevalence reported in these studies was 24, 20–28 and 29% respectively. The prevalence found in the present study is high compared with findings from the studies by Stanton et al. (1980), Dimpfl et al. (1992) and Viktrup et al. (1992). Again, much of the variation may be due to the different methods used in the studies (see Table 1 for details).

A response rate of 64% was achieved for questionnaire 2. If the non-responders were all assumed to be continent, a prevalence of 20% would be found. Alternatively, if non-responders were all assumed to be incontinent, the prevalence would be 56%. The true prevalence of symptoms of stress incontinence after birth, therefore, lies somewhere in the range of 20–56%.

The effect of non-response has only been investigated in one other study (Wilson et al. 1996). A comparison between responders and non-responders led the authors to conclude that the prevalence rate would not change if non-responders had responded. In the present study permission was not given by the ethics committees to collect data from the medical records of non-responders, so a similar analysis could not be undertaken. However, as the present study was similar to Wilson et al.'s study both in terms of methods and outcome, it is likely that the true prevalence would also not be greatly affected by non-response.

The sample in the present study varied with respect to the severity of their symptoms. Whilst one-half of the sample reported episodes of incontinence occurring once per week or less during pregnancy, the remainder had episodes which occurred at least several times per week. Ten per cent of all women (or 17% of the incontinent women) reported daily episodes, or more, or incontinence during their pregnancy. Viktrup et al. (1992) reported a similar finding of 6%.

Following delivery 2% of all women in the present study (or 8% of the incontinent women) reported daily incontinence following delivery. This figure is comparable to the 1% reported in Viktrup et al.'s study (1992) and 3.3% reported by Wilson et al. (1996) (the latter did, however, include all women irrespective of the type of incontinence symptoms).

One-quarter (25%) of women with symptoms of stress incontinence at eight weeks' postpartum reported that their symptoms first began following delivery. Viktrup et al. (1992) and Wilson et al. (1996) also reported that symptoms first began, in some cases, following delivery. These findings contradict Francis (1960) who stated that stress incontinence rarely, if ever, begins for the first time following delivery. Whilst Stanton et al. (1990) also supported Francis' conclusion no evidence was provided to substantiate this claim.

In this study further evidence is provided of the relationship between parity and stress incontinence, with increasing parity a risk factor for stress incontinence. Stanton et al. (1980) and Francis (1960) also reported a higher incidence of stress incontinence in multiparous women compared with nulliparous women. Iosif (1981) found a significant difference in the prevalence of stress incontinence in women of para 1 compared with women of para 2. Wilson et al. (1996) found increasing parity was a risk factor, but reported that the risk increased after four children. Whilst this finding has not been replicated here, this may be due to the small number of women of high order parity (13).

There are contradictory findings on the relationship between mode of delivery and

incontinence. There was no difference in the prevalence of stress incontinence following a normal vaginal delivery compared to an instrumental delivery in this study. This confirmed Wilson et al.'s (1996) findings. MacArthur et al. (1993) also reported that forceps delivery was not significantly associated with a higher level of stress incontinence. However, when the type of forceps was separated into non-rotational and rotational, the latter was found to have a weak association with stress incontinence. Dimpfl et al. (1992) reported a trend showing that women having an operative vaginal delivery had a higher prevalence of stress incontinence.

The protective effect of caesarean section has been confirmed in this study (Wilson et al. 1996, Viktrup et al. 1992, MacArthur 1993). Caesarean section was associated with a significantly lower prevalence of stress incontinence than vaginal delivery. As some women who had had a caesarean section reported symptoms of stress incontinence, it appears that the protective effect is not absolute. This confirms findings from previous studies (Wilson et al. 1996, Viktrup et al. 1992). In agreement with Wilson et al. (1996), the present study found no significant difference between the effects of elective caesarean section and those of an emergency caesarean section.

In summary, evidence has been provided that stress incontinence is a condition that many women experience during pregnancy and also following delivery. The prevalence rates are in agreement with some, but not all, of the previous studies undertaken on the subject. For many women the symptoms occur only occasionally. However, a small number of women are greatly affected by the condition, and report leakage on a daily basis.

ACKNOWLEDGEMENTS

The authors would like to thank the women who participated in the study and also staff at the two hospitals in which the study was undertaken.

REFERENCES

- Abrams P, Blavias JG, Stanton SL et al. 1998 The standardisation of terminology of lower urinary tract function. *Scandinavian Journal of Urology and Nephrology Supplement* 114: 5-9
- Allen RE, Hosker GL, Smith ARB et al. 1990 Pelvic floor damage and childbirth: a neurophysiological study. *British Journal of Obstetrics and Gynaecology* 97: 770-779
- Beck RP, Hsu N 1965 Pregnancy, childbirth and the menopause related to the development of stress incontinence. *American Journal of Obstetrics and Gynecology* 91(6): 322-329
- Becket J 1987 Incontinence and childbirth. *Health Visitor* 60: 12-13
- Bo K 1994 Reproducibility of instruments designed to measure subjective evaluation of female stress urinary incontinence. *Scandinavian Journal of Urology and Nephrology* 28: 97-100
- Cardozo L, Stanton SL 1991 Urinary incontinence and urodynamic investigations of female incontinence. In: Phillip E, Setchell M, Ginsberg J (eds) *Scientific foundations of obstetrics and gynaecology*. William Heinemann Medical Books, London
- De Muylder X, Claes H, Neven P et al. 1992 Usefulness of urodynamic investigations in female incontinence. *European Journal of Obstetrics & Gynaecology and Reproductive Biology* 44: 205-208
- Dimpfl TH, Hesse U, Schussler B 1992 Incidence and cause of postpartum urinary stress incontinence. *European Journal of Obstetrics & Gynaecology and Reproductive Biology* 43: 29-33
- Dolman ME 1992 Incontinence and childbirth: understanding the link. *Professional Care of Mother and Child* 2(7): 208-210
- Francis W 1960 The onset of stress incontinence. *Journal of Obstetrics and Gynecology* 67: 899-903
- Frazer MI, Haylen BT, Sutherst JR 1989 The severity of urinary incontinence in women: comparison of subjective and objective tests. *British Journal of Urology* 63: 14-15
- Gainey H 1955 Postpartum observation of pelvic tissue damage. *American Journal of Obstetrics and Gynecology* 70: 800-807
- Iosif S 1981 Stress incontinence during pregnancy and the puerperium. *International Journal of Gynaecology and Obstetrics* 19: 13-20
- Kondo A, Ohmura M, Itoh Y et al. 1991 An auxiliary test to supplement the 60 minute pad-weighting test and the patient's impression about the amount of urine loss. *International Urogynaecology Journal* 2: 22-24
- Lagro-Janssen ALM, Debruyne FMJ, Van Weel C 1991 Value of the patient's case history in diagnosing urinary incontinence in general practice. *British Journal of Urology* 67: 569-572
- MacArthur C, Lewis M, Bick D 1993 Stress incontinence after childbirth. *British Journal of Midwifery* 1(5): 207-213
- Malpas P, Jeffcoate T, Lister U 1949 The displacement of the bladder and urethra during labour. *Journal of Obstetrics and Gynaecology of the British Empire* 56: 949-960
- Milne JS 1976 Prevalence of incontinence in the elderly age groups. In: Willington FL (ed.) *Incontinence and the elderly*. Academic Press, London
- Sleep J, Grant A 1987 Pelvic floor exercises in postnatal care. *Midwifery* 3: 158-164
- Snooks SJ, Setchell M, Swash M et al. 1984 Injury to innervation of pelvic floor sphincter musculature in childbirth. *The Lancet* 2(8402): 546-550
- Stanton SL, Kerr-Wilson R, Gran-Harris V 1980 The incidence of urological symptoms in normal pregnancy. *British Journal of Obstetrics and Gynaecology* 97: 897-900
- Sultan A, Kamm M, Hudson C 1994 Prudential nerve damage during labour: prospective study before and after childbirth. *British Journal of Obstetrics and Gynaecology* 101: 22-28
- Ulmsten U 1997 Some reflections and hypotheses on the pathophysiology of female urinary incontinence. *Acta Obstetrica Gynecologica Scandinavica supplement* 166(76): 3-8
- Viktrup L, Lose MD, Rolff M et al. 1992 The symptoms of stress incontinence caused by pregnancy or delivery in primiparas. *Obstetrics and Gynecology* 79(6): 945-949
- Wilson PD, Herbison RM, Herbison GP 1996 Obstetric practice and the prevalence of urinary incontinence three months after delivery. *British Journal of Obstetrics and Gynaecology* 103: 154-161

The Experience of Stress Incontinence After Childbirth

Linda Mason, BSc, MSc, Sheila Glenn, BSc, PhD, CPsychol, AFBPS, Irene Walton, BEd, MSc, RM, MTD, and Carol Appleton, MEd, RN, RM, MTD

ABSTRACT: **Background:** Epidemiological studies have reported prevalence of stress incontinence ranging from 23 to 67 percent during pregnancy and 6 to 29 percent after childbirth, but little is known about how the condition affects women at this time. The purpose of this study was to examine the effects of stress incontinence on women in their childbearing years. **Methods:** Interviews were conducted with 42 women who experienced stress incontinence at 8 weeks postpartum and 15 women who reported symptoms one year after delivery. Analysis of the qualitative data involved exploring themes and patterns, relationships and connections, contradictions and contrasts, and the language used within individual accounts and across the spectrum of narratives. **Results:** The results are presented within a framework that the women themselves adopted: day-to-day activities, putting the condition in some form of perspective, and feelings and emotions. For some women, stress incontinence had a great impact on their lives in terms of both their daily routine and psychologically, but others described it as a minor inconvenience that rarely disturbed their routine. Major concerns comprised the restrictions placed on the women, the worry or continual awareness stemming from the condition, and feelings of embarrassment associated with it. Twelve months after childbirth the effects appeared to have lessened, but a few women were still significantly affected, both physically and psychologically. **Conclusions:** Although many women experience physical and psychological symptoms of stress incontinence after delivery, this study demonstrated that few sought professional care or advice for their symptoms. Health professionals should be aware of the prevalence, and women's responses to, stress incontinence so that they can initiate appropriate support and care. Further research on stress incontinence on childbearing women is necessary. (BIRTH 26:3 September 1999)

The most common form of urinary incontinence is that of stress incontinence (1), which is defined by the International Continence Society as "the involuntary loss of urine occurring when, in the absence of a detrusor contraction, the intravesical pressure exceeds the maximal urethral pressure" (2). This response occurs

when the urethra is unable to maintain closure against the force of pressure transmitted from the bladder. Although the causes are not yet fully understood, an incompetent urethral sphincter mechanism is thought to be responsible (3).

Epidemiological surveys of the prevalence of stress incontinence show that it affects many women during pregnancy and after childbirth. The reported prevalence during pregnancy ranges from 23 to 67 percent (4,5), and after childbirth from 6 to 31 percent (5,6). The variation results largely from methodological differences among studies. Factors affecting reported prevalence include the response rate, the measure used to assess whether or not symptoms are present, the timing of the study, and the study participants. Two recent studies (6,7) that attempted to address the methodological weaknesses in previous research both reported high prevalence after childbirth (31% and 24%)

Linda Mason is a doctoral student; Sheila Glenn is Head of Research in Health Care; Irene Walton is Principal Lecturer in Midwifery; and Carol Appleton is Senior Lecturer in Midwifery in the Department of Health, Liverpool John Moores University, Liverpool, United Kingdom.

Address correspondence to Linda Mason, BSc, MSc, School of Health, Liverpool John Moores University, 79 Tithebarn Street, Liverpool L2 2ER, United Kingdom.

in a sample comprising all women attending hospital for delivery, irrespective of their obstetric history and previous symptoms. Although studies agreed that vaginal delivery and parity were significant risk factors for stress incontinence after childbirth (6–9), evidence is contradictory concerning the role of other maternal or obstetric variables such as age (7,9), instrumental delivery (7,10), perineal suturing (7,9), length of labor (4,11), and birthweight (10,11). Incontinence during pregnancy was reported to be one of the strongest predictors of stress incontinence after childbirth according to one study (9). Despite variations in study findings, it can be concluded that since stress incontinence is a relatively common condition during pregnancy and after childbirth, it is important to study the effects on women's lives.

In spite of the high prevalence of stress incontinence, a review of the literature using Medline, Cinhal, and the Cochrane Database failed to locate any study that specifically examined the physical, emotional, and practical effects of stress incontinence on women in their childbearing years. Typically, most studies examined the effects of incontinence in general, irrespective of type, on a wide age range or on a middle-aged or elderly population. The literature review that follows will therefore consider the effects of all types of incontinence on women.

The effects of incontinence may vary according to the severity of the condition and the age of the woman (12,13). Women with stress incontinence have been reported in some studies to have fewer psychological problems, or to perceive their complaint to be less of a problem, compared with women who suffered from urge or mixed incontinence (13).

Some women described incontinence as a social rather than a medical problem (14,15), and it was also perceived as an inevitable consequence of motherhood (14). Because the condition was considered a taboo, women found it difficult or even unacceptable to talk about it (16). In some cases even sexual partners had little inkling of the severity or even the existence of the problem (14). Few women seek help for this condition, and those who do frequently wait for a year or more after it develops to discuss it (16–18). Many women reported feeling that they were the only person who had incontinence because of the taboo. It was therefore of the utmost importance to them that other people did not become aware of it.

Several studies reported that incontinence had a great impact on a woman's self-perception. Feelings of shame and embarrassment were common (19). Incontinence was also reported to affect levels of self-esteem and confidence. Women's mental and physical health suffered as a result of their condition (12,20). According to one study, one-fourth of all incontinent

women believed that their mental health was affected by their incontinence to a moderate or severe extent (21). Other reported psychological effects included depression, anxiety, irritability, worry, frustration, and tension (17).

Incontinence also affected the desire or ability to take part in recreational or sporting activities (19,21,22). It restricted the type of activity, such as shopping, travel, or going on holiday, that involved visiting unfamiliar places where toilet facilities were unknown or unavailable (21). According to one report, these activities were avoided to prevent other people from finding out about the condition (19). Women also reported that incontinence had a negative impact on sexual relationships (21,22), which in some cases resulted in the woman ceasing all sexual activity (17). Other studies observed that sexual relationships were affected only slightly (12,19).

Although a few studies (14,17,19) included younger women within their sample, they did not report results for this group separately. One study differentiated between age groups but looked at all forms of incontinence (23). The aim of our study was to examine the effects of stress incontinence on women specifically in their childbearing years. The study was designed to be exploratory, and the data were collected by means of open-ended interviews to allow the women to convey those issues important to them.

Method

The interviews were part of a wider study, carried out over a period of three years, from 1995 to 1997, that examined the prevalence of stress incontinence during pregnancy and after delivery (6). Women were recruited to the study when they registered at the clinic of two hospitals in northwest England. Questionnaires were sent to the study participants to determine the prevalence of stress incontinence at 8 weeks postpartum and at 1 year after childbirth. The symptoms of stress incontinence were deemed present if a positive response was given to the question, "Do you leak urine *during* physical activity or exertion, for example, *whilst* coughing, laughing, lifting heavy objects, climbing stairs, during sex, etc.?" At 8 weeks postpartum, 894 questionnaires were sent out of which 572 were returned completed. Of these, 180 women (31%) reported symptoms. All of the symptomatic women were contacted again by letter and invited to take part in an interview. Forty-two women, 23 percent of those with symptoms, consented. A comparison between the women who were interviewed and the sample of stress-incontinent women showed similarities with respect to age range, parity, and severity of symptoms (Table 1).

The process was repeated after administration of the questionnaire at one year after childbirth. Questionnaires were sent to the 180 women who had reported symptoms at 8 weeks postpartum. Of the 106 that were returned completed, 69 women (65%) reported symptoms of stress incontinence and were invited to take part in an interview. Fifteen women, 21 percent of those reporting symptoms, agreed to participate. Table 2 shows a comparison between interviewees and the total sample of symptomatic women.

Participants

Sample 1 consisted of 42 women whose ages ranged from 21 to 45 years (mean = 31) and their parity from 1 to 7. Two women were Asian, one was black, and 39 were Caucasian. The severity of their condition ranged from "less than one episode of incontinence per week" to "daily incontinence." Sample 2 comprised 15 women, whose ages ranged from 21 to 34 years (mean = 28), and all were para 1 or 2. Two women were Asian and 13 were Caucasian. The severity of their condition ranged from "less than one epi-

sode per week" to "daily incontinence." Five women participated in both interviews.

Although all women with symptoms of stress incontinence were contacted and invited to take part in an interview, it is possible that those who responded felt more at ease talking about their condition. Therefore their perspective may have been different from those women who were unwilling to talk about it. However, the final sample included women of all ages, parity, ethnicity, and degrees of severity with respect to their condition; they also appeared to have received different levels of service.

Procedure

The interviews were conducted by one of the authors (LM). They began with an introduction and clarification of the aims of the research. Every woman was then asked, "Please describe how having stress incontinence affects your life?" Each reply received an appropriate response from the interviewer so that the interview then took the form of a conversation. This allowed the women to concentrate on those issues they

Table 1. Women Who Reported Symptoms at 8 Weeks Postpartum Compared with Women Who Were Interviewed

	<i>Symptomatic Women at 8 Weeks Postpartum</i> (n = 180)	<i>Women Interviewed at 8 Weeks Postpartum</i> (n = 42)
Age		
Range (yr)	17-45	21-45
Mean (yr)	29.64	31.38
Standard deviation	5.16	5.43
Parity		
Range	1-7	1-7
Para 1	56 (31%)	14 (33%)
Para 1 +	124 (69%)	28 (67%)
Symptoms		
Range	Occasionally-daily	Occasionally-daily
Mode	Occasionally	Occasionally

Table 2. Women Who Reported Symptoms at One-Year Follow-up Compared with Women Who Were Interviewed

	<i>Symptomatic Women At 1-Year Follow-up</i> (n = 69)	<i>Women Interviewed at 1-Year Follow-up</i> (n = 15)
Age		
Range (yr)	17-45	21-34
Mean (yr)	29.74	28
Standard deviation	5.54	6.95
Parity		
Range	1-7	1-2
Para 1	26 (37%)	7 (40%)
Para 1 +	43 (63%)	8 (60%)
Symptoms		
Range	Occasionally-daily	Occasionally-daily
Mode	Occasionally	Occasionally

felt were pertinent, rather than having the agenda set by the interviewer. Since not all women wanted to be recorded on a cassette tape, the answers were written down on paper. The interview finished with a recap of the main points that had been raised by the participant to ensure that a true representation of her views was understood. The interviews lasted from between 20 and 90 minutes (mode = 30 min).

Data Analysis

Although the quantitative study strives for validity and reliability, credibility or truth value has been suggested as the more appropriate measure to seek in a qualitative study. The study transcripts were read through several times until the data became familiar to the investigator, and they were coded as topics, themes, patterns, and language emerged; some data were listed under more than one heading. Each of the coded items was then considered in turn. The transcripts were reread and recoded until no new items were found. The narratives were further explored in more depth by searching for descriptions, recurring themes and patterns, contrasts, and negative and deviant cases. Some of these characteristics emerged naturally from the data, and others were sought in response to specific questions or ideas. Another important step in the analysis involved consideration of the way in which the information was imparted. Phenomena such as language use, direct statements, inferred responses, and evasiveness and avoidance were considered to provide an understanding of what issues were important to the women themselves.

The next stage involved considering the items in relation to each other. Each transcript was reexamined to consider the data as individual cases rather than looking at items across cases. Contradictions and repetitions became evident at this stage. Provisional hypotheses were advanced to try and explain the different relationships. We returned repeatedly to the raw data to check that the issues described had not been taken out of context, overrepresented, or exaggerated. By showing the numbers of women involved in each item, and illustrating the text by using quotations, the decision-making process should appear visible and logical to readers. As a final verification, each participant was contacted by mail and asked if the interpretation that had been made accurately reflected her view of the interview.

Results

Effects at Two Months Postpartum

For some women stress incontinence had a great impact on their lives both physically and psychologically.

"It was worrying, I thought it was going to control my life," one woman said. In contrast, other women spoke about it in terms of being a minor inconvenience that rarely disturbed their routine and was something they seldom considered, for example, "Didn't pay much attention in a way . . . didn't bother me much. Did see things in magazines so I realized that's what it is, so not something completely unusual."

Twenty-eight of the 42 women first described incontinence in terms of its practical effects. Six women spoke of how the condition affected them psychologically until they were specifically questioned about it, yet later in the conversation 23 revealed that it affected them in a highly negative way. Despite this, only 7 of the 42 women had sought help or advice for their condition. The three major themes used by the women to describe their experiences of stress incontinence were perspectives on the condition, day-to-day activities, and feelings and emotions.

Perspectives on Stress Incontinence

Pregnancy and Motherhood. Eight women saw stress incontinence as being "part and parcel" of pregnancy or a consequence of giving birth. Because they appeared able to view the problem as rather inevitable it seemed to be less of a concern. As one woman said "It was a concern, but if you think you've just had a baby, and all it is is this, then . . ."

Acceptance and Nonacceptance. Contrasting attitudes were evident with respect to how the women accepted stress incontinence. Four different ways of confronting the problem were displayed. Seven women spoke of not letting it become a problem, for example, "Won't let it become a problem; it's not in my personality, will always find ways round it." Six women were positive the condition would ease itself and were therefore not too concerned. Three other women said that they had learned to accept incontinence because they had become used to it. One woman noted, "I think I've learnt to live with it and know that I can't run. Will always have to wear a pantyliner." Three more women spoke about being unable to accept it, and they worried that it did not seem to be going away. One of this group said, "It does get you down all the time. I was sick of it and kept thinking why doesn't it go away or when? I kept thinking this is it."

Other People's Reactions and Support. The women differed with respect to whether or not they sought social support and how helpful they found it. Seven women spoke of how it helped them to be able to discuss incontinence with a member of their family. Two described how they felt the condition was trivialized because it was treated in a humorous way by others. One woman observed, "People laugh as if it's

some sort of joke—even my boyfriend. I used to say, ‘don’t laugh at me.’ ” A third view, expressed by two women, was to keep their condition hidden from their family and friends. “Because as long as nobody knew—so in a way it was a problem. Didn’t want my husband to find out.”

Blaming Themselves. Five women blamed themselves for the incontinence. They thought that it was their fault either because they had not sought help or because they had not exercised their pelvic floor regularly enough, if at all. One woman in this group noted, “Sometimes I think it’s my own fault; that’s why I’ve never pushed it, because I’ve never done these exercises. So the Dr. would say if you’ve done pelvic floor exercises, then you wouldn’t be here.”

Day-to-Day Activities

During the course of the interview, 15 women spoke of having to wear a sanitary towel, or pantyliner, every day because they “always had to be prepared for an accident.” Other routines included frequent emptying of the bladder and the avoidance of certain activities. The restrictions placed on the women (or that they placed on themselves) was one of the main effects described by the participants. Fourteen women spoke of being restricted in one or more ways by their condition, usually in terms of being unable to undertake physical activity. One woman described it this way:

I used to do step aerobics—can’t do that at the moment. Won’t go swimming, dad has to take the children. I need protection if I go shopping or go out for the day. Won’t go on rides in Alton towers. Problems if I have to run after my 2-year-old. I can’t run at the minute or run for the bus. Sometimes happens when I raise my voice, sometimes no warning. More embarrassing when you’re shopping—there’s nothing you can do. Can’t laugh, cough, anything like that. It’s restricting—you always need to think what to take with you when you go out. Before I would go anywhere, do anything. Now I always have to think.

Five women spoke of how having stress incontinence restricted their role as mothers. They could not play with their children in several ways because activities such as running, chasing, and even laughing caused leakage. One mother said, “My little girl’s eight now, and I can’t run around and play with her. If she says ‘race you,’ I say ‘no—you’ll have to race your dad.’ ”

Feelings and Emotions

Of the range of feelings and emotions that were described in connection with stress incontinence, the three most common were worry, a constant awareness of the condition, and embarrassment. Eighteen women

spoke of being worried by some aspect of the condition. They gave reasons such as the fear that the incontinence was not going to get any better or was going to become worse in the future, and the fear of leaking, particularly at an inappropriate time or place. One participant said, “On social occasions—at Christmas I was very concerned during my husband’s work party. You’re aware of it all the time, worried of having a wet patch on my skirt.” Some were also concerned about others finding out. Another major worry concerned leaking during sex, for example, “It’s a constant worry . . . It affects my whole life. My biggest fear is having a leak when my husband and I are making love. It overshadows the proceedings.” Rather than actively worrying, 7 women acknowledged that it was something they were constantly aware of “more fed up of it, conscious of it all the time.” Of the 13 women who described feelings of embarrassment in connection with their condition, 9 stated that they had not sought help because they were uncomfortable talking about it. Stress incontinence was seen as an embarrassing problem to have, and talking about it was equally embarrassing.

Other Experiences

Six women described a slightly different picture. They were not particularly concerned about their condition and were rarely inconvenienced by it. For example, one said, “Just knew I was leaking a little bit, thought it would clear up and it did. Slight, so it wasn’t anything that worried me . . . No, it had no effect on my activities.”

Effects One Year After Birth

All 15 women were asked about the effects of stress incontinence on their lives at the time of the interview and during the past nine months. As with the first interview, their answers varied. Five women appeared to be still greatly affected, both in terms of practical and psychological effects, whereas the remainder were affected considerably less. Of the 15 women, only 3 had sought help or advice for their condition during the previous 12 months.

Changes Over Time

Only one woman thought that her incontinence had become worse during the previous 9 months, whereas seven women thought that it had improved since then. The other seven women thought that their condition had not altered with respect to the severity, but although it had remained the same, its effect had changed in some cases. Two women thought that it had become

less of a problem because they were "used to it." In contrast, three women became more concerned because the incontinence had not improved. Two women thought that their perceptions of it remained unchanged. As in the first interviews, the same three themes of perspectives on the condition, day-to-day activities, and feelings and emotions were used to describe the experience of stress incontinence.

Perspectives on Stress Incontinence

One year after the birth, the women did not tend to talk about their condition in terms of pregnancy or childbirth, even though it may have started or become worse at this time. As in the first interviews, five women spoke of their concern that other people might find out that they suffered from the condition. The need for secrecy still seemed to be a major concern that they faced in connection with their condition. Unlike the previous interviews, only one woman spoke about feeling to blame for her condition because she had not done her pelvic floor exercises.

Day-to-Day Activities

As with the first interviews, eight of the women talked about wearing sanitary towels or pantyliners and frequent emptying of the bladder to prevent accidents. During these interviews the women also spoke of performing pelvic floor exercises. Five women appeared to be less concerned about their condition than they otherwise might have been, because they believed that pelvic floor exercises helped, which seemed to give them confidence that they had some control over the problem. In the words of one woman, "No, it doesn't worry me at all because I know I can put it right. If I hadn't done the exercises, then it would be a bigger problem."

In contrast with the earlier interviews, only two women spoke about being restricted. Five women, who were specifically asked if they were restricted in any way by their condition, replied that it did not stop them from doing anything.

Feelings and Emotions

Compared with the participants who were interviewed at 8 weeks postpartum, these women appeared, on the whole, to be affected to a lesser degree psychologically by stress incontinence. Four women did, however, admit that they were still worried by it. As in the earlier interviews, one of the main issues emerging from the follow-up interviews concerned the embarrassment associated with stress incontinence. Nine women talked about this during the course of their

interview, mentioning again the embarrassment of having the condition itself, of discussing it with a health professional, and of other people finding out.

Contradictions During the Interviews

We had difficulty understanding what incontinence really meant to some of the women, because of apparent contradictions in many narratives. Some women reported that their condition was not sufficiently bad to merit seeking help or advice, yet later in the interview they described the problems it caused. A second pattern occurred whereby women described the condition as not a problem when directly questioned about it, yet elsewhere in the interview it was spoken about in ways suggesting that it was a problem, as in the following example: "No, not been preying on my mind at all. Worst was the lack of control, however, minimal, and being anxious that it doesn't get any worse. I keep thinking I must do something so that it doesn't get any worse." Another said, "Has been a problem, now and in the past . . . No, not really been a problem because I'm used to the idea that nothing serious is going on."

Discussion and Conclusions

As has been commonly reported in studies of incontinence, few women had sought help for their condition of stress incontinence (16,17). Rather, they described their own ways of dealing with the problem, which were similar to strategies that have been described for coping with stress and illness (24,25). An interview in a qualitative study is determined by the interaction between respondent and interviewer at that moment in time. Therefore, findings from the present study cannot be generalized to other populations and are applicable only to the immediate population.

During the initial stages of the interview the women described practical ways of coping to ensure that incontinence did not occur (frequent emptying of the bladder, avoidance of certain activities), or to minimize the problem (wearing pantyliners or sanitary towels to prevent leakage). These strategies appeared to be adopted consistently across the sample.

A further certain activity was also adopted as a means of keeping the incontinence hidden from others. For whatever reason a strategy was used, many women interviewed at 8 weeks postpartum were restricted, or chose to restrict their activities, because of their condition. Abstinence was primarily from physical activities, which sometimes involved their partners and children. Other studies have also reported on the restrictions placed on the women's lives by incontinence (13,19,22), again, usually in terms of physical activity

or avoidance of social events. Restrictions that involved children have not been reported in other studies, but this may be because most other studies have not examined the effects of stress incontinence on women in their reproductive years.

The women appeared to be less confident in talking about the psychological effects of stress incontinence, and the coping strategies that they adopted were not consistent. Examples included wishful thinking, seeking social support, self-blame, and distancing. Another strategy was that of denial, which was evident in the use of contradictions. One of the biggest fears described by the women was for others to find out that they were incontinent. Other studies reported a similar need for secrecy (14,15). A minority of women in our study spoke of not wanting their partners to find out. Some researchers also reported that sexual partners often had little or no idea of the existence of the incontinence (14). Much of this behavior resulted from feelings of embarrassment in connection with the condition, which was seen as a taboo subject. The women also described feelings of worry or a constant awareness of incontinence. Similarly, anxiety, fear, and inability to relax were recurrent comments made by the women in Norton's study (17).

The different impact that stress incontinence had on the women's lives may have been partially related to the severity of the condition. Other studies reported an association between severity and the impact of incontinence on the sufferer (12,21,26). They found that the degree of association was modest, however, suggesting a complex relationship between the two. In our study the women appeared to confront their condition with different attitudes. A few women who were unable to accept or denied the condition, appeared to have suffered to a greater extent than other participants because of this denial.

At 12 months the effects appeared to have eased somewhat, which may have resulted from improvements in the incontinence or changes in the perception of it. A few women, who thought that it was a bigger problem because it had not improved, were still deeply troubled by the condition. Other studies have similarly reported that a few women were greatly affected by their incontinence, irrespective of its type or severity (20,21,27). For these women the symptoms had a deep psychosocial impact on their lives.

The effects of stress incontinence on women after childbirth demonstrated many similarities to the effects of incontinence on the general population, as reported in the literature. One additional effect that was found in our study related to the restrictions on family oriented activities, such as playing with children. Although the effects generally seemed to lessen over a period of time, this may have resulted from a change in the

severity of the condition itself, a change in the perception of it, or adoption of beneficial coping strategies. In common with other studies on incontinence, a small number of women were found to be greatly affected both physically and psychologically.

This study has shown that women's lives can sometimes be severely affected by stress incontinence. It is important for health professionals to be aware both of the prevalence and of women's response to the condition. Further research on stress incontinence in childbearing women is necessary, not only to build on the existing knowledge about prevalence and causes, but also on the effects and most appropriate ways of treating and supporting women.

Those giving care to women during pregnancy and after childbirth should provide information on the condition and its management to women during these times. Few women in the study had sought help. Thus health professionals need to question women specifically about this condition, both during pregnancy and after childbirth, so that appropriate treatment can be offered. Women should also be made aware that help is available for the condition. This research also raises issues about the need to promote awareness of stress incontinence to lessen its taboo and the need for secrecy felt by women who suffer from the condition. Health educators and clinicians need to make people aware of its causes, which will help to put it within the context of a medical framework rather than a social condition, thus reducing the stigma and feelings of blame attached to it.

Acknowledgments

The authors would like to thank the women who participated in the study, and also staff at the two hospitals in which the study was undertaken.

References

1. Cardozo L, Stanton S. Urinary incontinence and urodynamic investigations of female incontinence. In: Philipp E, Setchel M, Ginsberg J, eds. *Scientific Foundations of Obstetrics and Gynaecology* London: William Heinemann, 1991:172-179.
2. Abrams P, Blavias JG, Stanton SL, Anderson JT. The standardisation of terminology of lower urinary tract function. *J Urol Nephrol Suppl* 1988;114:5-19.
3. Ulmsten U. Some reflections and hypotheses on the pathophysiology of female urinary incontinence. *Acta Obstet Gynecol Scand Suppl* 1997;76:3-8.
4. Iosif S. Stress incontinence during pregnancy and the puerperium. *Int J Gynaecol Obstet* 1981;19:13-20.
5. Francis W. The onset of stress incontinence. *J Obstet Gynaecol* 1960;67:899-903.
6. Mason L, Glenn S, Walton I, Appleton C. The prevalence of stress incontinence during pregnancy and following delivery. *Midwifery* 1999;15:120-128.
7. Wilson P, Herbison R, Herbison G. Obstetrics practice and

- the prevalence of urinary incontinence three months after delivery. *Br J Obstet Gynaecol* 1996;103:154-161.
8. Foldspang A, Mommsen S, Lam GW, Elving L. Parity as a correlate of adult female urinary incontinence prevalence. *J Epidemiol Community Health* 1992;46:595-600.
 9. Foldspang A, Mommsen S, Djurhuus J. Prevalent urinary incontinence as a correlate of pregnancy, vaginal childbirth, and obstetric techniques. *Am J Public Health* 1999;89:209-212.
 10. Dimpfl TH, Hesse U, Schussler B. Incidence and cause of postpartum urinary stress incontinence. *Eur J Obstet Reprod Biol* 1992;43:29-33.
 11. Skoner M, Thompson WS, Caron V. Factors associated with risk of stress urinary incontinence in women. *Nurs Res* 1994;43:301-306.
 12. Victor A, Tibblin G. A population study of urinary incontinence and nocturia among women aged 20-59 years: Prevalence, wellbeing and wish for treatment. *Acta Obstet Gynecol Scand* 1997;76:74-80.
 13. Hunskaar S, Vinsnes A. The quality of life in women with urinary incontinence as measured by the sickness impact profile. *J Am Geriatr Soc* 1991;39:378-382.
 14. Ashworth PD, Hagan MT. The meaning of incontinence: A qualitative study of non-geriatric urinary incontinence sufferers. *J Adv Nurs* 1993;18:1415-1423.
 15. Dowd TT. Discovering older women's experience of urinary incontinence. *Res Nurs Health* 1991;14:179-186.
 16. Yankelovich Partners Inc. *Women and Incontinence: Revealing America's Hidden Health Issue*. Norwalk, CT: Author, 1995.
 17. Norton C. The effects of urinary incontinence in women. *Int Rehab Med* 1982;4:9-14.
 18. Holst K, Wilson PD. The prevalence of female urinary incontinence and reasons for not seeking treatment. *NZ Med J* 1988;9:756-758.
 19. Lagro-Janssen T, Smits A, Van Weel C. Urinary incontinence in women and the effects on their lives. *Scand J Prim Health Care* 1992;10:211-216.
 20. Macaulay AJ, Stern RS, Holmes DM, Stanton SL. Micturition and the mind: Psychological factors in the aetiology and treatment of urinary symptoms in women. *Br Med J* 1987;294:540-543.
 21. Wyman JF, Harkins SW, Choi SC, et al. Psychosocial impact of urinary incontinence in women. *Obstet Gynecol* 1987;70:378-381.
 22. Lam GW, Foldspang A, Elving LB, Mommsen S. Social context, social abstention and problem recognition correlated with adult female urinary incontinence. *Dan Med Bull* 1992;39:565-570.
 23. Norton P, MacDonald L, Sedgwick P, Stanton S. Distress and delay associated with urinary incontinence, frequency, and urgency in women. *Br Med J* 1988;297:1187-1189.
 24. Folkman S, Lazarus RS. If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *J Pers Soc Psychol* 1985;48 (1):150-170.
 25. Folkman S, Lazarus RS, Gruen RJ, DeLongis A. Appraisal, coping, health status and psychological symptoms. *J Pers Soc Psychol* 1986;50:571-579.
 26. Vinsnes A, Hunskaar S. Distress associated with urinary incontinence as measured by a visual analogue scale. *Scand J Caring Sci* 1991;5:57-61.
 27. Jolleys JV. Reported prevalence of urinary incontinence in women in a general practice. *Br Med J* 1988;296:1300-1302.